UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS

UNITED STATES OF AMERICA, STATE OF ILLINOIS, Plaintiffs, v. KERR-MCGEE CHEMICAL LLC, Defendant.	CIVIL ACTION NO. _____

VOLUME 4

OF 11

APPENDICES TO CONSENT DECREE

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(N.D. ILLINOIS)

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APPENDIX G

RI/FS ADMINISTRATIVE ORDER ON CONSENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:	)	Docket No. V-W- '04-C-767
	)	
KERR-MCGEE KRESS CREEK/WEST BRANCH OF DUPAGE RIVER SITE AND KERR-MCGEE SEWAGE TREATMENT PLANT SITE.	)	ADMINISTRATIVE ORDER BY CONSENT PURSUANT TO SECTIONS 104, 107 & 122 OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT, as amended, 42 U.S.C. §§ 9604,9607 and 9622
WEST CHICAGO AND DUPAGE COUNTY, ILLINOIS	)	
RESPONDENT: KERR-MCGEE CHEMICAL, LLC.	)	

I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Order by Consent (the "Order") is entered voluntarily by the United States Environmental Protection Agency ("U.S. EPA") and Respondent Kerr-McGee Chemical, LLC ("Respondent"). The Order is issued pursuant to the authority vested in the President of the United States by Sections 104, 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §§ 9604, 9607 and 9622. This authority has been delegated to the Administrator of the U.S. EPA by Executive Order No. 12580, January 23, 1987, 52 Federal Register 2923, and further delegated to the Regional Administrators by U.S. EPA Delegation Nos. 14-14-A, 14-14-C and 14-14-D, and to the Director, Superfund Division, Region 5, by Regional Delegation Nos. 14-14-A, 14-14-C and 14-14-D.

2. This Order requires Respondent to conduct a Remedial Investigation and Feasibility Study ("RI/FS") to investigate the nature and extent of contamination and to develop and evaluate potential remedial alternatives at the Kress Creek/West Branch of DuPage River Site ("Kress Creek Site") and at the river portion of the Sewage Treatment Plant Site ("STP River OU"). This Order also requires Respondent to conduct an RI at the upland portion of the STP Site ("STP Upland OU"). The Kress Creek and STP Sites are located in West Chicago and DuPage County, Illinois, and are generally depicted in Appendix 1.

3. Excluding certain areas in the Kress Creek Site located between the Warrenville and McDowell Dams, Respondent already has significantly characterized the Sites, including drilling over 15,000 borings to delineate the extent of contamination. In October of 2002, Respondent submitted to U.S. EPA a Characterization Report that sets forth the results of

Respondent's prior characterization work on the Kress Creek Site and the STP River OU. Respondent also has significantly characterized the STP Upland OU. Respondent may use its prior characterization efforts in completing the RI because Respondent has demonstrated that such work conformed to U.S. EPA guidance regarding sampling, quality assurance/quality control, data validation, and chain of custody procedures. U.S. EPA also has performed significant characterization work at the Sites. Respondent shall include an evaluation of that data in completing the RI. This Order does not contemplate duplication of prior efforts.

4. In October and November of 2002, Respondent submitted to U.S. EPA two reports, one styled "Conceptual Design Report" and the other styled "Reach-Specific Alternatives Evaluation Report." In March 2003, Respondent submitted an additional report styled "Conceptual Design Report Addendum - Reach 8." Respondent may utilize appropriate information contained in those reports to prepare its Feasibility Study. Moreover, Respondent has removed radionuclides from two related sites - the Residential Areas site ("RAS") and the Reed-Keppler Park ("RKP") site - through excavation and off-site disposal at a facility in Utah licensed to accept radionuclides. Respondent may utilize relevant knowledge and experience acquired in conducting those removals to prepare its Feasibility Study.

5. Under Section VIII of this Order, Respondent has agreed to pay to U.S. EPA all Oversight Costs relating to this Order. Respondent reserves, and its payment of these Oversight Costs is without prejudice to, all rights Respondent may have with respect to any claim or cause of action by the United States for payment of any and all costs not specifically included in the definition of Oversight Costs in Paragraph 41.

6. A copy of this Order will be provided to the State of Illinois, which has been notified of the issuance of this Order. U.S. EPA has also notified the federal natural resource trustees of the negotiations in this action pursuant to the requirements of Section 122(j) of CERCLA.

7. Respondent agrees to undertake all actions required by the terms and conditions hereunder, and consents to and will not contest or legally challenge the issuance of this Consent Order or U.S. EPA's jurisdiction regarding this Consent Order.

8. Respondent's participation in this Order shall not constitute an admission of liability or of U.S. EPA's Findings of Fact or Conclusions of Law and Determinations contained in this Order except in a proceeding to enforce the terms of this Order. Respondent agrees to comply with and be bound by the terms of this Order. Respondent further agrees that in a proceeding to

enforce the terms of this Order, it will not contest the basis or validity of this Order or its terms.

II. PARTIES BOUND

9. This Order applies to and is binding upon U.S. EPA and upon Respondent and Respondent's heirs, receivers, trustees, successors and assigns. Any change in ownership or corporate status of Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter Respondent's responsibilities under this Order.

10. Commencing on the Effective Date of this Order and continuing until the date of U.S. EPA's notice of completion of work pursuant to Section XVIII, Respondent shall ensure that its contractors, subcontractors, and representatives receive a copy of this Order and comply with this Order. Respondent shall be responsible for any noncompliance with this Order. Respondent shall provide a copy of this Order to any subsequent owners or successors before ownership rights or stock or assets are transferred in a corporate acquisition, merger or sale.

III. STATEMENT OF PURPOSE

11. In entering into this Order, the objectives of U.S. EPA and Respondent are: (a) to determine the nature and extent of contamination and any threat to the public health, welfare, or the environment caused by the release or threatened release of hazardous substances, pollutants or contaminants at or from the Sites by completing a remedial investigation; (b) to determine and evaluate alternatives for remedial action to prevent, mitigate or otherwise respond to or remedy any release or threatened release of hazardous substances, pollutants, or contaminants at or from the Sites or facilities; by conducting a feasibility study; and (c) to provide for the recovery of oversight costs incurred by U.S. EPA with respect to this Order.

IV. FINDINGS OF FACT

12. Based on available information, including the Administrative Record in this matter, U.S. EPA hereby finds, and, for purposes of enforceability of this Order only, Respondent stipulates that the factual statutory prerequisites under CERCLA necessary for issuance of this Order have been met. U.S. EPA's findings and this stipulation include the following:

a. The Sites are located in West Chicago and DuPage County, Illinois. The Kress Creek Site is defined as follows: (i) Kress Creek from the storm sewer outfall located south of Roosevelt Road on the east side of the Elgin-Joliet and

Eastern Railway to Kress Creek's confluence with the West Branch DuPage River; and (ii) the West Branch DuPage River from its confluence with Kress Creek to the McDowell Dam. The STP Site includes two Operable Units and is defined as follows: (i) the West Chicago Sewage Treatment Plant owned and operated by the City of West Chicago located adjacent to the West Branch DuPage River at Illinois Routes 59 and 38, Sarana Drive, West Chicago, Illinois ("STP Upland OU"); and (ii) the West Branch DuPage River from the northern boundary of West Chicago's Sewage Treatment Plant to the West Branch's confluence with Kress Creek ("STP River OU"). These two Sites are depicted in Appendix 1. The Kress Creek Site and the STP River OU have been conceptually divided into eight "reaches" for purposes of characterization and remediation.

b. From approximately 1932 through 1973, the Sites became contaminated with mill tailings resulting from thorium and rare earths processing at the Rare Earths Facility ("REF"), located in West Chicago, Illinois. The mill tailings contained radionuclides and heavy metals, including lead, barium, chromium and cadmium.

c. The STP Site was listed on the National Priorities List ("NPL") on August 30, 1990. 55 Fed. Reg. 35502. The Kress Creek Site was listed on the NPL on February 11, 1991. 56 Fed. Reg. 5598.

d. Respondent is a successor to the companies that, from 1932 to 1973, operated the REF, which was the source of the mill tailings.

e. Respondent has undertaken removal actions at the RAS and the RKP Site pursuant to Unilateral Administrative Orders V-W-95-C-272 and V-W-96-C-364.

f. Consistent with Respondent's Radioactive Material License and amendments thereto, Respondent is authorized to temporarily store radioactively-contaminated material removed from the Sites at the REF, where the materials are prepared for shipping to an out-of-state facility licensed to accept the materials.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

13. Based on the Findings of Fact set forth above, and the Administrative Record in this matter, U.S. EPA has determined that:

a. The REF, the Kress Creek Site and the STP Site are "facilities" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

b. Radionuclides, lead, barium, chromium and cadmium are "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

c. Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

d. Respondent is a successor to companies who allegedly (i) owned or operated a facility (the REF) from which there was a release or threat of release of hazardous substances to the Sites; and/or (ii) arranged for disposal or transport for disposal of hazardous substances at the Sites. Respondent therefore may be liable under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

e. The presence of hazardous substances at the Sites or the past, present or potential migration of hazardous substances currently located at or emanating from the Sites, or the placement of hazardous substances from the Sites onto off-site areas constitute actual and/or threatened "releases" of hazardous substances from a facility into the "environment" as defined by Sections 101(8) and (22) of CERCLA, 42 U.S.C. §§ 9601(8) and (22).

f. The actions required by this Order are necessary to protect the public health, welfare, or the environment, and are not inconsistent with the NCP and CERCLA.

VI. ORDER

Based upon the foregoing Findings of Fact, Conclusions of Law and Determinations, and the Administrative Record for these Sites, it is hereby ordered and agreed that Respondent shall comply with the following provisions, including but not limited to all attachments to this Order, and all documents incorporated by reference into this Order, and perform the following actions:

A. DESIGNATION OF CONTRACTOR, PROJECT COORDINATOR, AND REMEDIAL PROJECT MANAGER.

14. Respondent has selected a contractor known as Blasland, Bouck & Lee, Inc. ("BBL") to perform the actions required by this Order. If Respondent decides to retain a different or an additional contractor(s) to perform any actions required by this Order, Respondent shall notify U.S. EPA of the name and qualifications of such contractor(s) within 10 days prior to the

commencement of work by that contractor(s). U.S. EPA retains the right to disapprove of any of the contractors and/or subcontractors retained by Respondent. If U.S. EPA disapproves a selected contractor, Respondent shall retain a different contractor within 10 calendar days following U.S. EPA's disapproval, and shall notify U.S. EPA of that contractor's name and qualifications within 14 calendar days of U.S. EPA's disapproval.

15. Respondent has designated Mark Krippel as its Project Coordinator. Mr. Krippel shall be responsible for administration of all Respondent's actions required by the Order. If Respondent decides to designate a different or an additional Project Coordinator, U.S. EPA retains the right to disapprove of any Project Coordinator named by Respondent. If U.S. EPA disapproves a selected Project Coordinator, Respondent shall designate a different Project Coordinator within 14 calendar days following U.S. EPA's disapproval and shall notify U.S. EPA of that person's name and qualifications within 14 calendar days of U.S. EPA's disapproval. Receipt by Respondent's Project Coordinator of any notice or communication from U.S. EPA relating to this Order shall constitute receipt by the Respondent.

16. U.S. EPA has designated Rebecca Frey of the Superfund Division, Remedial Response Branch, Region 5, as its Remedial Project Manager ("RPM"). Respondent shall direct all submissions required by this Order to the RPM along with the required copies in accordance with Section XIX (Submittals/Correspondence). Respondent is encouraged to make its submissions to U.S. EPA on recycled paper (which includes significant post-consumer waste paper content where possible) and using two-sided copies.

17. U.S. EPA and Respondent, subject to Paragraph 15, shall have the right to change their designated RPM or Project Coordinator. U.S. EPA shall notify Respondent, and Respondent shall notify U.S. EPA, as early as possible before such a change is made, but in no case less than 24 hours before such a change. The initial notification may be made orally but it shall be promptly followed by a written notice within 4 calendar days of oral notification.

B. WORK TO BE PERFORMED

18. Respondent shall develop and submit to U.S. EPA, with copies to the Illinois Environmental Protection Agency ("IEPA") and the Illinois Emergency Management Agency, Division of Nuclear Safety ("IEMA/DNS") (collectively, the "State"), an RI report for the Sites and an FS report for the Kress Creek Site and the STP River OU, in accordance with the Statement of Work ("SOW") that is attached as Appendix 2. The SOW is incorporated into and made an enforceable part of this Order.

19. The RI report and the FS report shall be consistent with, at a minimum, U.S. EPA guidance entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (U.S. EPA, Office of Emergency and Remedial Response, October, 1988) and any other guidance that U.S. EPA uses in conducting an RI/FS. One of the remedial alternatives that Respondent will evaluate in the FS will be the cleanup approach agreed upon between Respondent and the affected communities, as set forth in the October 2002 Conceptual Design Report, the November 2002 Reach-Specific Alternatives Evaluation Report, and the March 2003 Conceptual Design Report Addendum - Reach 8. The description in the FS of the remedial alternative that reflects the cleanup approach agreed upon between Respondent and the affected communities will not be subject to modification by U.S. EPA.

20. RI Submissions related to Reaches 1-7 and STP Upland OU. In accordance with the SOW, for Reaches 1-7 of the Sites and the STP Upland OU, Respondent shall submit the following deliverables to U.S. EPA, with copies to the State, at the following times:

Draft RI Report	December 3, 2003
Final RI Report	21 days after receipt of U.S. EPA's notification of revisions on Draft RI Report

21. FS Submissions related to Reaches 1-7. In accordance with the SOW, for Reaches 1-7 of the Sites, Respondent shall submit the following deliverables to U.S. EPA, with copies to the State, at the following times:

Draft FS Report	December 3, 2003
Final FS Report	21 days after receipt of U.S. EPA's notification of revisions on Draft FS Report

22. Supplemental Characterization for Reach 8. By no later than December 31, 2004, in accordance with the SOW, Respondent shall submit to U.S. EPA for review, with copies to the State, supplemental characterization data for the areas within Reach 8 of the Kress Creek Site that were not previously characterized. The submittal shall fully describe the work conducted and the findings of the characterization work and shall supplement the characterization report already prepared for all other previously-characterized portions of the Kress Creek Site. The

characterization work for Reach 8 will use methods consistent with those used to characterize Reaches 1-7.

23. Quality Assurance and Sampling

a. Prior to the Effective Date of this Order, Respondent undertook significant characterization work at the Kress Creek and STP Sites. By letter dated July 15, 2003, Respondent submitted, for U.S. EPA approval, a document that identified how Respondent had complied with and would continue to comply with U.S. EPA guidance regarding sampling, quality assurance/quality control ("QA/QC"), data validation, and chain of custody procedures. In its July 15, 2003 document, Respondent also identified the procedures that it intended to comply with after July 15, 2003, to ensure that all sampling and characterization work after July 15, 2003, conforms to U.S. EPA guidance.

b. By letter dated August 26, 2003, U.S. EPA determined that Respondent's past characterization work had conformed to U.S. EPA guidance regarding sampling, QA/QC, data validation, and chain of custody procedures. U.S. EPA also approved the procedures that Respondent indicated it would comply with after July 15, 2003, to ensure that future sampling and characterization work continued to conform to applicable U.S. EPA guidance.

24. Respondent shall demonstrate that BB&L (or any subsequent contractor that Respondent retains) has a quality system which complies with ANSI/ASIC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," American National Standard, January 5, 1995, by submitting, within 14 days of the Effective Date of this Order, a copy of BB&L's (or subsequent contractor's) Quality Management Plan ("QMP") for review and approval by U.S. EPA. The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001).

25. U.S. EPA (in consultation with the State) may approve, disapprove, require revisions to, or modify the documents that Respondent must submit pursuant to Paragraphs 18, 20, 21 and 22; provided however, that Respondent's description in the FS of the remedial alternative that reflects the cleanup approach agreed upon between it and the affected communities will not be subject to modification by U.S. EPA. If U.S. EPA requires revisions, Respondent shall submit a revised document incorporating all of U.S. EPA's required revisions within 21 calendar days of receipt of U.S. EPA's notification of the required revisions.

26. In the event of U.S. EPA disapproval of the revised submission, Respondent may be deemed in violation of this Order. In such event, U.S. EPA retains the right to terminate this Order, or any part or subpart herein, and conduct a complete RI/FS or any portions thereof, and obtain reimbursement for costs incurred in conducting these activities from Respondent.

27. For the draft and final RI and FS reports, Respondent shall include the following certification signed by a person who supervised or directed the preparation of that report:

> Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this Report, the information submitted is true, accurate, and complete.

28. Reporting. Respondent shall submit a monthly written progress report to U.S. EPA, with copies to the State, concerning actions undertaken pursuant to this Order. The progress reports shall be submitted on or before the tenth day of each month following the Effective Date of this Order, and continuing until the date of U.S. EPA's notice of completion of work pursuant to Section XVIII, unless otherwise directed in writing by the RPM. These reports shall describe all significant developments during the preceding month, including the work performed and any problems encountered, and developments anticipated during the next reporting period, including a schedule of work to be performed, anticipated problems, and actual or planned resolutions of past or anticipated problems.

29. Additional Work. In the event that U.S. EPA or Respondent determines that additional work is necessary to accomplish the objectives of the RI and/or FS Reports, notification of such additional work shall be provided to the other party in writing. Any additional work which Respondent determines to be necessary shall be subject to U.S. EPA's written approval (in consultation with the State) prior to commencement of the additional work. Respondent shall complete, in accordance with standards, specifications, and schedules U.S. EPA has approved, any additional work that (i) Respondent has proposed, and which U.S. EPA has approved in writing; or (ii) U.S. EPA has determined to be necessary, and has provided written notice of pursuant to this paragraph.

C. ACCESS TO PROPERTY AND INFORMATION.

30. Respondent shall provide or obtain access to the Sites and off-site areas to which access is necessary to implement this Order, and shall provide access to all records and documentation related to the conditions at the Sites and the actions conducted pursuant to this Order. Such access shall be provided to U.S. EPA, IEPA, IEMA/DNS, and their employees, contractors,

agents, consultants, designees, and representatives. These individuals shall be permitted to move freely at the Sites and appropriate off-site areas to which Respondent has access in order to conduct actions which U.S. EPA determines to be necessary. Respondent shall submit to U.S. EPA, with copies to the State, upon receipt, the results of all sampling or tests and all other data generated by Respondent or their contractor(s), or on the Respondent's behalf during implementation of this Order.

31. Where work or action under this Order is to be performed in areas owned by or in possession of someone other than Respondent, Respondent shall use its best efforts to obtain all necessary access agreements within 30 calendar days after the Effective Date of this Order, or as otherwise specified in writing by the RPM. Respondent shall notify U.S. EPA within 4 calendar days if, after using its best efforts, it is unable to obtain such agreements. Respondent shall describe in writing its efforts to obtain access. U.S. EPA may, in its discretion, then assist Respondent in gaining access, to the extent necessary to effectuate the actions described herein, using such means as U.S. EPA deems appropriate. Respondent shall reimburse U.S. EPA for all costs and attorneys fees incurred by the United States in obtaining such access.

D. RECORD RETENTION, DOCUMENTATION, AVAILABILITY OF INFORMATION.

32. Respondent shall preserve all documents and information in its possession relating to work performed under this Order, or relating to the hazardous substances found on or released from the Sites, for ten years following completion of the actions required by this Order. At the end of this ten year period and at least 60 calendar days before any document or information is destroyed, Respondent shall notify U.S. EPA that such documents and information are available to U.S. EPA for inspection, and upon request, shall provide the originals or copies of such documents and information to U.S. EPA. In addition, Respondent shall provide copies of any such non-privileged documents and information retained under this Section at any time before expiration of the ten year period at the written request of U.S. EPA.

33. If Respondent asserts a privilege in lieu of providing documents, they shall provide U.S. EPA with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the contents of the document, record, or information; and (6) the privilege asserted by Respondent. However, no documents, reports, or other information created or

generated pursuant to the requirements of this Order shall be withheld on the grounds that they are privileged.

E. OFF-SITE SHIPMENTS

34. All hazardous substances, pollutants or contaminants removed off-site pursuant to this Order for treatment, storage or disposal shall be treated, stored, or disposed of at a facility in compliance, as determined by U.S. EPA, with the U.S. EPA Revised Off-Site Rule, 40 CFR § 300.440.

F. COMPLIANCE WITH OTHER LAWS

35. Respondent shall perform all activities required pursuant to this Order in accordance with all the requirements of all federal and state laws and regulations. U.S. EPA has determined that the activities required by this Order are consistent with the National Contingency Plan ("NCP").

36. Except as provided in Section 121(e) of CERCLA and the NCP, no permit shall be required for any portion of the activities conducted entirely on-site. Where any portion of the activities is to be conducted off-site and requires a federal or state permit or approval, Respondent shall submit timely and complete applications and take all other actions necessary to obtain and to comply with all such permits or approvals.

37. This Order is not, and shall not be construed to be, a permit issued pursuant to any federal or state statue or regulation.

G. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

38. If any incident, or change in conditions at the Sites, during the activities conducted pursuant to this Order causes or threatens to cause an additional release of hazardous substances from the Sites or an endangerment to the public health, welfare, or the environment, Respondent shall immediately take all appropriate action to prevent, abate or minimize such release or endangerment caused or threatened by the release. Respondent shall also immediately notify the RPM or, in the event of her unavailability, shall notify the Regional Duty Officer, Emergency Response Branch, Region 5 at (312) 353-2318, of the incident or Site conditions. If Respondent fails to respond, U.S. EPA may respond to the release or endangerment and reserve the right to recover costs associated with that response.

39. Respondent shall submit a written report to U.S. EPA within 10 calendar days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release.

Respondent shall also comply with any other notification requirements, including those in CERCLA Section 103, 42 U.S.C. § 9603, and Section 304 of the Emergency Planning and Community Right-To-Know Act, 42 U.S.C. § 11004.

VII. AUTHORITY OF THE U.S. EPA REMEDIAL PROJECT MANAGER

40. The RPM shall be responsible for overseeing the implementation of this Order. The RPM shall have the authority vested in an RPM by the NCP, including the authority to halt, conduct, or direct any activities required by this Order, or to direct any other response action undertaken by U.S. EPA or Respondent at the Sites. Absence of the RPM from the Sites shall not be cause for stoppage of work unless specifically directed by the RPM.

VIII. REIMBURSEMENT OF OVERSIGHT COSTS

41. Respondent shall pay all RI/FS Oversight Costs that U.S. EPA incurs relating to the Sites that are not inconsistent with the NCP. "RI/FS Oversight Costs" shall mean costs incurred by U.S. EPA after September 30, 2003, relating to this Order, including but not limited to direct and indirect costs related to overseeing work performed under this Order, and reviewing or developing plans, reports and other items pursuant to this Order. U.S. EPA will send Respondent a bill for Oversight Costs on an annual basis.

42. Respondent shall, within 45 calendar days of receipt of a bill from U.S. EPA, remit a cashier's or certified check for the amount of the bill made payable to the "Hazardous Substance Superfund," to the following address:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 70753
Chicago, Illinois 60673

Respondent shall simultaneously transmit a copy of the check to the Director, Superfund Division, U.S. EPA Region 5, 77 West Jackson Blvd., Chicago, Illinois, 60604-3590. Payments shall be designated as "RI/FS Oversight Costs - Kress Creek/STP Sites" and shall reference the Respondent's name and address, the EPA site identification numbers 05QS and 05QW and the docket number of this Order.

43. The total amount paid by Respondent pursuant to Paragraph 41 shall be deposited in the Kerr-McGee West Chicago Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at, in connection with, or in the vicinity of, the Kerr-McGee West

Chicago Sites, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

44. In the event that any payment is not made within the deadlines described above, Respondent shall pay interest on the unpaid balance. Interest is established at the rate specified in Section 107(a) of CERCLA, 42 U.S.C. § 9607(a). The interest shall begin to accrue on the date of Respondent's receipt of the bill. Interest shall accrue at the rate specified through the date of the payment. Payments of interest made under this paragraph shall be in addition to such other remedies or sanctions available to the United States by virtue of Respondent's failure to make timely payments under this Section.

45. If any dispute over costs is resolved before payment is due, the amount due will be adjusted as necessary. If the dispute is not resolved before payment is due, Respondent shall pay the full amount of the uncontested costs into the Special Account within the EPA Hazardous Substance Superfund as specified above on or before the due date. Within the same time period, Respondent shall pay the full amount of the contested costs into an interest-bearing escrow account. Respondent shall simultaneously transmit a copy of both checks to the RPM. Respondent shall ensure that the prevailing party or parties in the dispute shall receive the amount upon which they prevailed from the escrow funds plus interest within 20 calendar days after the dispute is resolved.

IX. DISPUTE RESOLUTION

46. Unless otherwise expressly provided for in this Order, the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes arising under this Order. The Parties shall attempt to resolve any disagreements concerning this Order expeditiously and informally.

47. If Respondent objects to any U.S. EPA action taken pursuant to this Order, including billings for Oversight Costs, they shall notify U.S. EPA in writing of their objection(s) within 10 calendar days of such action, unless the objection(s) has/have been resolved informally. EPA and Respondent shall have 30 calendar days from U.S. EPA's receipt of Respondent's written objection(s) to resolve the dispute through formal negotiations (the "Negotiation Period"). The Negotiation Period may be extended at the sole discretion of U.S. EPA.

48. Any agreement reached by the Parties pursuant to this Section shall be in writing and shall, upon signature by the Parties, be incorporated into and become an enforceable part of this Order. If the Parties are unable to reach an agreement within the Negotiation Period, the Director of the U.S. EPA Superfund Division, Region 5, will issue a written decision on

the dispute to Respondent. EPA's decision shall be incorporated into and become an enforceable part of this Order. Respondent's obligations under this Order shall not be tolled by submission of any objection for dispute resolution under this Section. Following resolution of the dispute, as provided by this Section, Respondents shall fulfill the requirement that was the subject of the dispute in accordance with the agreement reached or with EPA's decision, whichever occurs.

X. FORCE MAJEURE

49. Respondent agrees to perform all requirements under this Order within the time limits established under this Order, unless the performance is delayed by a force majeure. For purposes of this Order, a force majeure is defined as any event arising from causes beyond the control of Respondent that delays or prevents performance of any obligation under this Order despite Respondent's best efforts to fulfill the obligation. Force majeure does not include financial inability to complete the work, increased cost of performance, or normal weather events.

50. Respondent shall notify U.S. EPA orally within 5 days after Respondent becomes aware of any events that Respondent contends constitute a force majeure, and in writing within 30 calendar days after Respondent becomes aware of any event which constitutes a force majeure. Such notice shall: identify the event causing the delay or anticipated delay; estimate the anticipated length of delay, including necessary demobilization and re-mobilization; state the measures taken or to be taken to minimize the delay; and estimate the timetable for implementation of the measures. Respondent shall take all reasonable measures to avoid and minimize the delays. Failure to comply with the notice provision of this Section shall be grounds for U.S. EPA to deny Respondent an extension of time for performance. Respondent shall have the burden of demonstrating by a preponderance of the evidence that the event is a force majeure, that the delay is warranted under the circumstances, and that best efforts were exercised to avoid and mitigate the effects of the delay to the satisfaction of U.S. EPA.

51. If U.S. EPA determines a delay in performance of a requirement under this Order is or was attributable to a force majeure, the time period for performance of that requirement shall be extended as deemed necessary by U.S. EPA. Such an extension shall not alter Respondent's obligation to perform or complete other tasks required by the Order which are not directly affected by the force majeure.

XI. STIPULATED AND STATUTORY PENALTIES

52. Respondent shall be liable to U.S. EPA for stipulated penalties in the amounts set forth in this Paragraph unless excused under Section X (Force Majeure) or unless U.S. EPA, in its unreviewable discretion, waives its right to demand all or a portion of the stipulated penalties due under this Section. For each calendar day, or portion thereof, that Respondent fails to fully perform any requirement of this Order in accordance with the schedule established pursuant to this Order, Respondent shall be liable as follows:

Deliverable/Activity	Penalty For Days 1-7	Penalty For > 7 Days
Failure to Submit the Draft RI or FS Report	$350/day	$1000/day
Failure to Submit the final RI or FS Report	$350/day	$1000/day
Late Submittals of of Progress Reports	$200/day	$350/day
Failure to meet any other deadline in this Order	$200/day	$350/day

53. Upon receipt of written demand by U.S. EPA, Respondent shall make payment to U.S. EPA within 20 calendar days and interest shall accrue on late payments in accordance with Section VIII of this Order ("Reimbursement of Oversight Costs").

54. Even if violations are simultaneous, separate penalties shall accrue for separate violations of this Order. Penalties accrue and are assessed per violation per day. Penalties shall accrue regardless of whether U.S. EPA has notified Respondent of a violation or act of noncompliance. The payment of penalties shall not alter in any way Respondent's obligation(s) to complete the performance of the work required under this Order. Stipulated penalties shall accrue, but need not be paid, during any dispute resolution period concerning the particular penalties at issue. If Respondent prevails upon resolution, Respondent shall pay only such penalties as the resolution requires. In its unreviewable discretion, U.S. EPA may waive its rights to demand all or a portion of the stipulated penalties due under this Section.

55. The stipulated penalties set forth above shall not be the sole or exclusive remedy for violations of this Order and shall not preclude U.S. EPA from pursuing any other remedy or sanctions which are available to the agencies because of the

Respondent's failure to comply with this Consent Order. Should Respondent violate this Order or any portion hereof, U.S. EPA may carry out all or part of the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. §§ 9604. Payment of stipulated penalties does not alter Respondent's obligation to complete performance under this Consent Order.

XII. RESERVATION OF RIGHTS

56. Except as specifically provided in this Order, nothing herein shall limit the power and authority of U.S. EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants, contaminants, or oil or hazardous or solid waste on, at, or from the Sites. Further, nothing herein shall prevent U.S. EPA from seeking legal or equitable relief to enforce the terms of this Order. U.S. EPA also reserves the right to take any other legal or equitable action as it deems appropriate and necessary, or to require Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law. U.S. EPA reserves its rights in regard to claims, prior actions, orders, or agreements with Respondent. The covenant not to sue by U.S. EPA set forth in Section XIV does not pertain to any matters other than those expressly identified therein. The United States and U.S. EPA reserve, and this Agreement is without prejudice to, all rights against Respondent with respect to all other matters, including but not limited to:

a. liability for failure of Respondent to meet a requirement of this Order;

b. liability for costs incurred or to be incurred that are not Oversight Costs as defined in Paragraph 41 of Section VIII of this Order;

c. liability for injunctive relief or administrative order enforcement under Section 106 of CERCLA, 42 U.S.C. § 9606, excluding work performed under the terms of this Order;

d. criminal liability; and

e. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments.

XIII. OTHER CLAIMS

57. By issuance of this Order, the United States and U.S. EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondent. The United States or U.S. EPA shall not be a party or be held out as a party to any contract entered into by the Respondent or their directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out activities pursuant to this Order.

58. Except as expressly provided in Section XIV (Covenant Not To Sue), nothing in this Order constitutes a satisfaction of or release from any claim or cause of action against the Respondent or any person not a party to this Order, for any liability such person may have under CERCLA, other statutes, or the common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106(a) or 107(a) of CERCLA, 42 U.S.C. §§ 9606(a), 9607(a).

59. This Order does not constitute a preauthorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2). Respondent waives any claim to payment under Sections 106(b), 111, and 112 of CERCLA, 42 U.S.C. §§ 9606(b), 9611, and 9612, against the United States or the Hazardous Substance Superfund arising out of any action performed under this Order.

60. No action or decision by U.S. EPA pursuant to this Order shall give rise to any right to judicial review except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

XIV. COVENANT NOT TO SUE

61. Except as otherwise specifically provided in this Order, upon issuance of the U.S. EPA notice referred to in Section XVIII (Notice of Completion), U.S. EPA covenants not to sue Respondent for judicial imposition of damages or civil penalties or to take administrative action against Respondent for any failure to perform actions agreed to in this Order except as otherwise reserved herein.

62. Except as otherwise specifically provided in this Order, in consideration and upon Respondent's payment of the Oversight Costs specified in Paragraph 41 of Section VIII of this Order, U.S. EPA covenants not to sue or to take administrative action against Respondent under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), for recovery of Oversight Costs, as defined in Paragraph 41 of Section VIII, incurred by the United States in

connection with this Order. This covenant not to sue shall take effect upon the receipt by U.S. EPA of the payments required by Section VIII (Reimbursement of Oversight Costs).

63. These covenants not to sue are conditioned upon the complete and satisfactory performance by Respondent of its obligations under this Order. These covenants not to sue extend only to Respondent and do not extend to any other person.

XV. CONTRIBUTION PROTECTION

64. With regard to claims for contribution against Respondent for matters addressed in this Order, the Parties hereto agree that Respondent is entitled to protection from contribution actions or claims to the extent provided by Section 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4). The "matters addressed" in this Order are the work that Respondent is required to perform pursuant to Section VI and the Oversight Costs (as defined in Paragraph 41 of Section VIII) that Respondent is required to pay. Nothing in this Order precludes Parties to this Order from asserting any claims, causes of action or demands against any persons not parties to this Order for indemnification, contribution, or cost recovery.

XVI. INDEMNIFICATION

65. Respondent shall indemnify, save and hold harmless the United States, its officials, agents, contractors, subcontractors, employees and representatives from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, or subcontractors, in carrying out actions pursuant to this Order. In addition, Respondent agrees to pay the United States all costs incurred by the United States, including but not limited to attorneys fees and other expenses of litigation and settlement, arising from or on account of claims made against the United States based on negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, subcontractors and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Order. The United States shall not be held out as a party to any contract entered into by or on behalf of Respondent in carrying out activities pursuant to this Order. Neither Respondent nor any such contractor shall be considered an agent of the United States.

66. The United States shall give Respondent notice of any claim for which the United States plans to seek indemnification

pursuant to this Section and shall consult with Respondent prior to settling such claim.

67. Respondent waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of Work on or relating to the Sites. In addition, Respondent shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of Work on or relating to the Sites.

XVII. MODIFICATIONS

68. Except as otherwise specified in Section VI (Work To Be Performed), if any party believes modifications to any plan or schedule are necessary during the course of this project, they shall conduct informal discussions regarding such modifications with the other parties. Any agreed-upon modifications to any plan or schedule shall be memorialized in writing within 10 calendar days; however, the effective date of the modification shall be the date of the RPM's oral direction. Any other requirements of this Order may be modified in writing by mutual agreement of the parties. Any modification to this Order shall be incorporated into and made an enforceable part of this Order.

69. If Respondent seeks permission to deviate from any approved plan or schedule, Respondent's Project Coordinator shall submit a written request to U.S. EPA for approval (in consultation with the State) outlining the proposed modification and its basis.

70. No informal advice, guidance, suggestion, or comment by U.S. EPA regarding reports, plans, specifications, schedules, or any other writing submitted by Respondent shall relieve Respondent of its obligations to obtain such formal approval as may be required by this Order, and to comply with all requirements of this Order unless it is formally modified.

XVIII. NOTICE OF COMPLETION

71. When U.S. EPA determines that all work has been fully performed in accordance with this Order, except for certain continuing obligations required by this Order (e.g., record retention, payment of costs), U.S. EPA will provide written notice to Respondent.

XIX. SUBMITTALS/CORRESPONDENCE

72. Any notices, documents, information, reports, plans, approvals, disapprovals, or other correspondence required to be submitted from one party to another under this Order, shall be deemed submitted either when hand-delivered or as of the date of receipt by certified mail/return receipt requested, express mail, or facsimile in accordance with this section. Correspondence and communications from U.S. EPA and the State shall be addressed to:

Harold Holmberg
Kerr-McGee Chemical LLC
Kerr-McGee Center
P.O. Box 25861
Oklahoma City, OK 73125
Phone 405 270-3820
FAX 405 270-3439
Email kmg.com

Mark Krippel
Kerr-McGee Chemical LLC
800 Weyrauch St.
West Chicago, IL 60185
Phone 630 293-6331
FAX 630 231-3990
Email ng.com

Tom Goresen
Kerr-McGee Chemical LLC
123 Robert S. Kerr Ave.
Oklahoma City, OK 73102
Phone: 405 270-2857
Fax: 405 270-4101
Email: ıg.com

J.T. Smith II
Covington & Burling
1201 Pennsylvania Ave., NW
Washington, DC 20004-2401
Phone: 202 622-5555
Fax: 202 622-6291
Email: [illegible]v.com

All correspondence, communication, and submittals from Respondent shall be directed to the following and additional individuals they identify:

Rebecca Frey
Remedial Project Manager

United States Environmental Protection Agency
77 West Jackson Blvd., Mailcode SR-6J
Chicago, Illinois 60604-3590
Phone (312) 886-4760
FAX (312) 886-4071
Email epa.gov

With copies to:

Thomas Williams
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62702
Phone (217) 815 223-1714
FAX (217) 815 223-1344
E-mail pa.state.il.us

Richard Allen
Illinois Emergency Management Agency, Division of Nuclear Safety
1035 Outer Park Dr.
Springfield, IL 62704
Phone (217) 782-1322
Fax (217) 524-6417
E-mail .state.il.us

Mary Fulghum
Associate Regional Counsel
U.S. EPA - Region 5
77 West Jackson Boulevard, C-14J
Chicago, Illinois 606064-3590
Phone (312) 886-4683
FAX (312) 886-0747
E-mail epa.gov

Gerald Karr
Illinois Attorney General's Office
188 W. Randolph St., 20th Floor
Chicago, IL 60601
Phone (312) 814-3369
Fax (312) 814-2347
Email tate.il.us

XX. SEVERABILITY

73. If a court of competent jurisdiction issues an order that invalidates any provision of this Order or finds that Respondent has sufficient cause not to comply with one or more provisions of this Order, Respondent shall remain bound to comply with all provisions of this Order not invalidated by the court's order.

XXI. EFFECTIVE DATE AND COMPUTATION OF TIME

74. The Effective Date of this Order shall be the date of the signature of the Director, Superfund Division, U.S. EPA Region 5. For the purposes of this Order, the term "day" shall mean a calendar day. In computing any period of time under this Order, where the last day of the period would fall on a Saturday or Sunday, the period shall run until noon, Central Time of the following Monday.

XXII. SIGNATORIES

75. Each undersigned representative of a signatory to this Administrative Order on Consent certifies that he or she is fully authorized to enter into the terms and conditions of this Order

and to bind such signatory, its directors, officers, employees, agents, successors and assigns, to this document.

Agreed this 18th day of November, 2003.

Kerr-McGee Chemical, LLC

By _____

Typed Name: George D. Christiansen

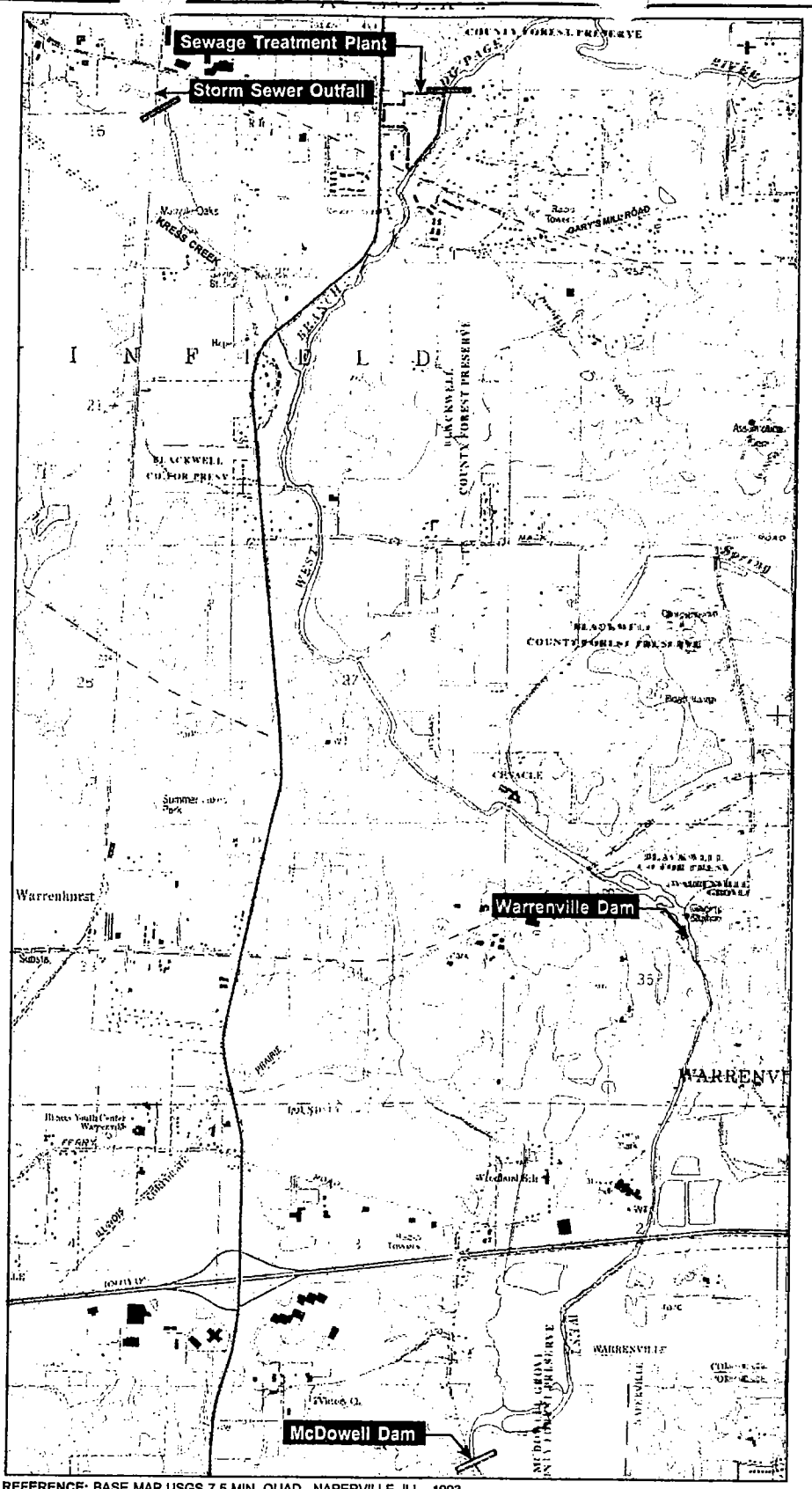
Title: Vice President, Safety and Environmental Affairs

Address: P.O. Box 25861
Oklahoma City, OK 73125

IT IS SO ORDERED AND AGREED

BY: _____ DATE: 11/21/03
for William E. Muno, Director
Superfund Division United States
Environmental Protection Agency
Region 5

APPENDIX 1



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., NAPERVILLE, ILL., 1993.

2000' 0 2000'

Approximate Scale: 1" = 2000'

LEGEND:

= Indicates Upstream Limit

= Indicates Downstream Limit

Area Location

11/11/03 SYR-DBS-DJH
7100410/71004n01.cdr

KERR-MCGEE CHEMICAL LLC
KRESS CREEK/WEST BRANCH DUPAGE RIVER AND SEWAGE TREATMENT PLANT SITES
RI/FS STATEMENT OF WORK

SITE LOCATION MAP

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 2-1

APPENDIX 2

STATEMENT OF WORK FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY AT THE KRESS CREEK/WEST BRANCH OF DUPAGE RIVER SITE AND THE SEWAGE TREATMENT PLANT SITE

DuPage County, Illinois

November 2003

1.0 Purpose

This Statement of Work (SOW) sets forth the requirements for preparing a Remedial Investigation (RI) Report and Feasibility Study (FS) Report for the Kress Creek/West Branch of DuPage River (Kress Creek or KC) Site and the Sewage Treatment Plant (STP) Site (hereinafter collectively referred to as "the Sites") located in DuPage County, Illinois. The RI Report shall evaluate and discuss the nature and extent of hazardous substances, pollutants or contaminants at the Sites, and shall provide sufficient data for development and evaluation of various remedial alternatives. The United States Environmental Protection Agency (USEPA) will prepare, separate from the RI Report, the Baseline Human Health and Ecological Risk Assessments which will assess potential risks at the Sites. As a result, the RI Report will not include a Baseline Human Health Risk Assessment nor an Ecological Risk Assessment for the Sites. The FS Report shall evaluate alternatives for addressing the impact to human health and the environment from hazardous substances, pollutants, or contaminants at the Kress Creek Site and the river portion of the STP Site[1] (as established by the Baseline Risk Assessment conducted by USEPA).

The RI and FS Reports shall comply with all pertinent requirements and guidance including the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300) as amended. At a minimum, the RI and FS Reports shall be prepared consistent with relevant portions of the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA, October 1988) which describes the RI and FS format and required report content. Any other guidance that the USEPA uses in conducting or submitting deliverables for a RI and FS, including any new guidance published during the conduct of the RI and FS (which USEPA will provide in a reasonable time frame prior to the submittal of final deliverables identified in this SOW), will be utilized to prepare the RI and FS Reports in

[1] An Administrative Order on Consent (AOC) for a removal action at the portion of the STP Site encompassed by the West Chicago Sewage Treatment Plant was executed on October 16, 2003. Accordingly, that portion of the STP Site will not be considered in the FS Report.

accordance with these guidance documents. A partial listing of pertinent guidance documents is provided in Attachment A.

Kerr-McGee Chemical, LLC (Kerr-McGee) shall provide all personnel, materials, and services necessary for preparing the RI and FS Reports at the Sites in accordance with the provisions of this SOW. As provided for in CERCLA Section 104(a)(1), as amended by Superfund Amendments and Reauthorization Act (SARA), USEPA will provide oversight of Kerr-McGee's activities. Kerr-McGee shall support USEPA's activities related to the implementation of oversight activities.

2.0 Site Description

The Kress Creek Site is defined as follows: (i) approximately 1.5 miles of Kress Creek from the stormwater sewer outfall located south of Roosevelt Road on the east side of the Elgin-Joliet and Eastern Railway to Kress Creek's confluence with the West Branch DuPage River (River); and (ii) approximately 5.2 miles of the River from its confluence with Kress Creek to the McDowell Dam. The STP Site is defined as follows: (i) the West Chicago Sewage Treatment Plant owned and operated by the City of West Chicago located adjacent to the River at Illinois Routes 59 and 38, Sarana Drive, West Chicago, Illinois; and (ii) approximately 1.2 miles of the River from the northern boundary of West Chicago's Sewage Treatment Plant to the West Branch's confluence with Kress Creek. These two sites are collectively known as the "Sites" in this SOW and are depicted in Figure 2-1. The river portion of the STP site includes those portions of the STP site not addressed by the removal action conducted pursuant to the October 16, 2003, AOC. Specifically, the river portion of the STP site includes all portions of the STP Site except for the "upland" portion of the site located to the west of the dashed line in Figure 2-2.

Reach 8 of the Kress Creek Site is the portion of the site located between the Warrenville Dam and the McDowell Dam. Kerr-McGee has already extensively characterized portions of Reach 8 and shall conduct additional characterization activities in the remaining portions of Reach 8.

The Sites consist of various tracts of land that include residences, property owned by religious organizations, community parks, a county forest preserve, an operating sewage treatment plant and other land belonging to local government agencies. Collectively, the Sites traverse Gunness Lake, Manville Oaks Park, the Nichiren Shoshu Temple property, Roy C. Blackwell Forest Preserve, the Warrenville Cenacle, Warrenville Grove Forest Preserve, McDowell Grove Forest

Preserve, and encompass several bridges. Land type throughout the Sites ranges from residential to forest preserve/park.

3.0 Document Review

Kerr-McGee shall submit all documents or deliverables required as part of this SOW to the USEPA, with a copy provided to the State Agencies, including the Illinois Environmental Protection Agency (IEPA) and the Illinois Emergency Management Agency - Division of Nuclear Safety (IEMA-DNS), for review and approval by USEPA. After review of any plan, report, other item, or portion thereof which is required to be submitted for approval pursuant to this SOW, USEPA, after reasonable opportunity for review and comment by the State, may: (a) approve, in whole or in part, the submission; (b) require revisions to the submission; (c) modify the submission; (d) disapprove, in whole or in part, the submission; or (e) any combination of the above to conform the submission to the requirements of the AOC, this SOW, or RI/FS guidance. If USEPA requires revisions to any document, USEPA may notify Kerr-McGee of the required revisions in writing or during meetings with Kerr-McGee, as appropriate. If USEPA requires revisions, Kerr-McGee shall submit a revised submission incorporating all of USEPA's required revisions within 21 calendar days of receipt of USEPA's notification of the required revisions. If Kerr-McGee and USEPA agree that it would be beneficial to meet during this time period to mutually work on and agree upon a revised submission, then the parties shall do so within the same 21 day time period, unless additional time is needed as agreed to in writing by both parties.

4.0 Scope

The five tasks to be completed under this RI/FS SOW and a brief task description are provided below. Each task is described in greater detail in later sections of this SOW.

Task 1: Community Relations

Requirements of this task include Kerr-McGee providing technical assistance to USEPA, as needed, for implementation of USEPA's Community Relations Plan. This task is described in more detail in Section 5.

Task 2: RI Report

This task requires Kerr-McGee to prepare and submit to USEPA, for review, a draft RI Report for the Sites. Section 6 of this SOW describes in more detail the requirements for preparation of the RI Report, including the outline of the report.

Task 3: FS Report

This task requires Kerr-McGee to prepare and submit to USEPA, for review, a draft FS Report for the Kress Creek Site and the river portion of the STP Site. Section 7 of this SOW describes in more detail the requirements for conducting the evaluation and preparing the FS Report, including the requirements for (a) developing and screening remedial alternatives, (b) conducting a detailed analysis of alternatives, and (c) summarizing and presenting in the FS Report steps (a) and (b) above.

Task 4: Supplemental Characterization

This task requires Kerr-McGee to prepare and submit to USEPA, for review, supplemental characterization data for the areas located within Reach 8 of the Kress Creek Site that require additional characterization work during fall 2003 and early 2004. Section 8 of this SOW describes the required elements of the supplemental characterization.

Task 5: Progress Reports

This task requires Kerr-McGee to submit written monthly progress reports to USEPA and the State. Section 9 of this SOW describes the required elements of the progress reports.

5.0 Task 1: Community Relations

USEPA has the responsibility of developing and implementing community relations activities for the Sites. Critical components of the community relations activities include conducting community interviews and developing/updating a Community Relations Plan. Although implementing the Community Relations Plan is the responsibility of USEPA, if requested by USEPA, Kerr-McGee shall assist USEPA by: providing information regarding the Site histories; participating in public meetings; and assisting in preparing fact sheets for distribution to the general public. All Kerr-McGee-conducted community relations activities shall be planned and developed in coordination with USEPA.

6.0 Task 2: Remedial Investigation Report

As provided in Attachment B (Schedule of Major Deliverables), Kerr-McGee shall submit to USEPA, for review, a draft RI Report for the Kress Creek and STP Sites. The RI Report shall be prepared consistent with the AOC and this SOW, and will be prepared in accordance with the outline provided below. The RI Report will provide information on the physical characteristics of the Sites, discuss Site investigations, the results of these investigations, and the nature and extent of hazardous substances, pollutants or contaminants at the Sites, and shall provide sufficient data for development and evaluation of remedial alternatives.

Outline of RI Report

Executive Summary

The Executive Summary shall provide a general overview of each component provided within the RI Report. It shall contain a brief discussion of the Sites and a general discussion of the nature and extent of potential hazardous substances, pollutants or contaminants at the Sites. It shall also explain that the RI Report does not include Baseline Human Health or Ecological Risk Assessments for the Sites and that USEPA will prepare those risk assessments as a separate document or documents.

Section 1. Introduction

The introductory section will provide a discussion on the purpose of the report and contain Site background and historical information. The following components will be included in this section of the report:

- *1.1 Purpose of Report/Regulatory Background*
- *1.2 Report Organization*
- *1.3 Site Background*
  - *1.3.1 Site Histories*
  - *1.3.2 Site Descriptions*
    - *1.3.2.1 Kress Creek/West Branch DuPage River Site*
    - *1.3.2.2 West Chicago Sewage Treatment Plant Site*
  - *1.3.3 Previous Investigations*
  - *1.3.4 Previous Remedial Activities*
- *1.4 Overview of the RI Activities*

Section 2. Physical Characteristics of the Sites

This section will include a detailed description of the physical characteristics of the Sites including a summary of available data from any field activities performed to obtain information on demographic, topographic, and other physical characteristics. Information on physical characteristics will be used to describe the environmental setting of the Sites and surrounding areas, and will be used to define potential transport pathways and receptor populations. Specific topics that will be included in this section are provided below.

- *2.1 Surrounding Land Use and Demographics*
- *2.2 Topography*
- *2.3 Meteorology*
- *2.4 Surface Water Hydrology*
  - *2.4.1 General*
  - *2.4.2 Flow Patterns and Data*
- *2.5 Geology*
- *2.6 Soils/Sediment*
- *2.7 Hydrogeology*
  - *2.7.1 Regional Hydrogeology*
  - *2.7.2 Site Hydrogeology*
- *2.8 Environmental Setting and Ecological Characteristics*
  - *2.8.1 Terrestrial Ecology*
  - *2.8.2 Aquatic Ecology*
- *2.9 Natural Regional Background Radiation*
  - *2.9.1 Radiation Exposure*
  - *2.9.2 Radioactivity in Soil*
  - *2.9.3 Radioactivity in Groundwater*

Section 3. Site Investigations

This section will describe those investigations performed to identify and understand the extent of hazardous substances, pollutants or contaminants in soils, sediment, groundwater, surface water, and overall ecology at the Sites. Available analytical data obtained through these investigations will also be presented in summary form. The following provides a detailed listing of those investigations that will be included in this section. The entity listed in parenthesis after the investigation indicates the party that initiated and performed the investigation.

- *3.1 Introduction*
- *3.2 Radiological Field Studies*
  - *3.2.1 1993 Radiological Walkover Survey – KC & STP (USEPA)*
  - *3.2.2 1994 Radiological Walkover Survey - STP (USEPA)*
  - *3.2.3 1995 Radiological Walkover Survey - KC (USEPA)*
  - *3.2.4 1997-2002 Surface Gamma Survey (Kerr-McGee)*
  - *3.2.5 1997-2003 Radiological Subsurface Delineation Drilling (Kerr-McGee)*

Section 4. Nature and Extent of Contamination

This section will provide an analysis of the data collected through investigations, including the location, quantity and/or magnitude of the hazardous substances, pollutants or contaminants, the characteristics of such contaminants and the nature and extent of contamination within the environmental media (i.e., soil, sediment, groundwater, surface water, and fish tissue) at the Sites. Components to be provided in this section are listed below.

- *4.1 Introduction*
- *4.2 Site-Specific Background*
- *4.3 Upland STP Sample Data*
  - *4.3.1 Soil*
    - *4.3.1.1 Soil: Radiological Field Studies*
    - *4.3.1.2 Soil: Radiological Laboratory Studies*
    - *4.3.1.3 Soil: Metals*
    - *4.3.1.4 Soil: Organics*
  - *4.3.2 Groundwater*
    - *4.3.2.1 Groundwater: Radiological Laboratory Studies*
    - *4.3.2.2 Groundwater: Metals*
    - *4.3.2.3 Groundwater: Organics*
- *4.4 Kress Creek/West Branch DuPage River Sample Data*
  - *4.4.1 Source Sample Data*
  - *4.4.2 Kress Creek/West Branch DuPage River Soil/Sediment Data*
    - *4.4.1.1 Soil/Sediment: Radiological Field Studies*
    - *4.4.1.2 Soil: Radiological Laboratory Studies*
    - *4.4.1.3 Soil: Metals*
    - *4.4.1.4 Sediment: Radiological Laboratory Studies*
    - *4.4.1.5 Sediment: Metals*
    - *4.4.1.6 Sediment: Organics*
    - *4.4.1.7 Sediment: Size Fractionation Study*
  - *4.4.3 Surface Water and Leachability Investigation*
  - *4.4.4 Fish Tissue Investigation*

Section 5. Contaminant Fate and Transport

The results of the physical characterization, Site investigations, and the nature and extent of contamination will be utilized to determine contaminant fate and transport at the Sites. This section will focus on defining the contaminant(s) of potential concern, their properties, affected areas, and potential migration pathways as provided below:

- *5.1 Contaminants of Potential Concern*
- *5.2 Contaminant Characteristics*
  - *5.2.1 Physiochemical Properties*
  - *5.2.2 Radioactive Transformations*
  - *5.2.3 Constituent Persistence*

5.3 Affected Areas
5.4 Contaminant Migration
5.4.1 Sediment Transport
5.4.2 Soil Transport
5.4.3 Leaching of Soil/Sediment Contaminants to Surface Water and Groundwater
5.4.4 Surface Water Transport
5.4.5 Groundwater Transport
5.4.6 Soil/Sediment Erosion

Section 6. Summary and Conclusions

The summary and conclusions section will provide a summary (as provided below) of the conceptual site model and the recommended remedial action objectives for use in the FS Report.

6.1 Conceptual Site Model
6.2 Conclusions
6.2.1 Data Limitations and Recommendations for Future Work
6.2.2 Recommended Remedial Action Objectives

As described in Section 1.0, USEPA will prepare Baseline Risk Assessments (Human Health and Ecological) for the Sites, which will provide an evaluation of the potential threat to human health and the environment without any remedial action. As a result, the RI Report will not include a section for discussion of risk.

7.0 Task 3: Feasibility Study Report

As provided in Attachment B (Schedule of Major Deliverables), Kerr-McGee shall submit to USEPA, for review, a draft FS Report for the Kress Creek Site and the river portion of the STP Site. The FS Report shall be prepared consistent with the AOC and this SOW and in accordance with the outline provided below. During the preparation of the FS Report, Kerr-McGee shall develop and screen remedial alternatives and conduct a detailed analysis of remedial alternatives. This information shall be summarized and presented in the FS Report. In addition, the FS Report shall include information USEPA will need to prepare relevant sections of the Records of Decision (RODs) for the Sites [see Chapters 6 and 9 of the USEPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decisions Documents* (EPA 540-R-98-031, July 1999) for necessary information].

Outline of FS Report

Executive Summary

The Executive Summary will provide a general overview of each component provided within the FS Report. It will provide a brief description of potential remedial alternatives along with the results of the detailed and comparative analyses of the remedial alternatives.

Section 1. Introduction

The introductory section will provide a general overview of the FS Report and its components (as provided below), including a brief discussion of background information (primarily summarized from the RI Report).

- *1.1 Purpose and Organization of Report*
- *1.2 Background Information*
  - *1.2.1 Site Histories*
  - *1.2.2 Site Descriptions*
    - *1.2.2.1 Kress Creek/West Branch DuPage River Site*
    - *1.2.2.2 West Chicago Sewage Treatment Plant Site*
  - *1.2.3 Nature and Extent of Contamination*
  - *1.2.4 Contaminant Fate and Transport*
- *1.3 Baseline Risk Assessments (if available from USEPA)*

Section 2. Development of Remedial Action Objectives and General Response Actions

This section will provide a summary of the Sites' remedial action objectives (RAOs), applicable or relevant and appropriate requirements (ARARs), general response actions (GRAs), and identification of volumes and areas subject to evaluation. The RAOs will specify the constituents of concern and the media of interest, and exposure pathways and receptors as addressed in the Baseline Risk Assessments (being prepared by USEPA). The RAOs will also specify the acceptable contaminant level or range of levels based on ARARs. The GRAs will be developed to meet the RAOs and include no further action, containment, excavation, or other actions singly or in combination. Also, volumes or areas to which the GRAs may apply will be identified. The following components will be provided in this section of the report:

- *2.1 Introduction*
- *2.2 Remedial Action Objectives*
- *2.3 Identification of ARARs and TBCs (including chemical-, action-, location-specific, as well as other criteria, advisories, and guidance)*
- *2.4 General Response Actions*
- *2.5 Volumes and Areas Potentially Subject to Remediation*

Section 3. Identification and Screening of Technology Types and Process Options

This section will include the identification and evaluation of potential remedial technology types and process options applicable to each GRA with respect to technical implementability, along with the elimination of those not implementable. Potentially implementable technology types and process options will be further screened and carried forward to identify the representative processes that will be used to develop a range of remedial alternatives. Together, all of the alternatives shall represent a range of remedial alternatives that shall address the Sites. Steps specific to the screening process are explained in further detail below.

Preliminary alternatives assumed to be carried forward will be no action, monitored natural recovery, removal, and in-place containment (capping). The following provides the specific components of this section:

3.1 Introduction

3.2 Initial Identification and Screening of Technology Types and Process Options

3.3 Evaluation of Technology Types and Selection of Representative Process Options

- *In an initial screening step, evaluates the range of potential applicable technology types and process options with respect to technical implementability; potentially implementable technology types and process options are further screened with respect to effectiveness, implementability and relative cost, and then carried forward to identify representative processes that can be used to develop a range of remedial alternatives in Section 3.2 [for example dredging would be a process option under the sediment removal technology type]*

3.4 Assembly of Potential Remedial Alternatives

- *Assemble a range of remedial alternatives for each Site (see footnote 1) as a whole (beyond just those to be evaluated in the detailed analysis); list will include general alternatives [e.g., no action, in-place containment (capping), rechannelization, removal], but there may be other combinations of technologies/process options*

3.5 Alternatives Screening Process

- *Screens the alternatives identified in Section 3.2 based on broad consideration of effectiveness, implementability and relative cost to identify those alternatives that will be carried forward into the detailed evaluation of alternatives; preliminary alternatives assumed to be carried forward are No Action, Monitored Natural Recovery, In-Place Containment (Capping), and Removal, but there may be other alternatives involving combinations of technologies/process options that may be carried forward; specifies the reasons for eliminating alternatives during the preliminary screening process; identifies any additional action-specific ARARs for the alternatives that remain after screening that were not identified in Section 2.3.*

Section 4. Detailed Evaluation of Remedial Alternatives

In this section, each remedial alternative carried forward from the screening process will be evaluated against the nine evaluation criteria which include: (1) overall protection of human health and the environment; (2) compliance with ARARs (including chemical-, action-, and location-specific ARARs, as well as other criteria, advisories, and guidance); (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, and volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state (support agency) acceptance; and (9) community acceptance. (Note criteria 8 and 9 are considered after the RI and FS Reports have been released to the general public.) For each remedial alternative, a description of the alternative and a discussion of each individual evaluation criteria assessment will be provided. If Kerr-McGee does not have direct input on state (support agency) acceptance and community acceptance (criteria 8 and 9), USEPA will address these criteria. The following components will be provided in this section:

- *4.1 Introduction*
- *4.2 Evaluation Criteria*
- *4.3 Detailed Evaluation of Alternatives [To be completed in consideration of each Site as a whole (see footnote 1). The alternatives assumed to be carried forward are no action, monitored natural recovery, removal, and in-place containment (capping), but there may be other alternatives/combinations of technologies carried forward.]*
  - *4.3.1 Alternative 1 - No Action*
    - *4.3.1.1 Description*
    - *4.3.1.2 Assessment*
  - *4.3.2 Alternative 2 - Monitored Natural Recovery*
    - *4.3.2.1 Description*
    - *4.3.2.2 Assessment*
  - *4.3.3 Alternative 3 - Removal*
    - *4.3.3.1 Description*
    - *4.3.3.2 Assessment*
  - *4.3.4 Alternative 4 – In-Place Containment*
    - *4.3.4.1 Description*
    - *4.3.4.2 Assessment*

Section 5. Comparative Analysis of Alternatives

This section will provide a comparative analysis between remedial alternatives using the first seven of the nine evaluation criteria as a basis of comparison (as provided below). From this comparative analysis and considering state (support agency) acceptance and community acceptance (criteria 8 and 9), USEPA will select the preferred alternative for the Proposed

Remedial Plan for each Site. The following provides the components to be included in this section:

5.1 Introduction
5.2 Overall Protection of Health and the Environment
5.3 Compliance with ARARs
5.4 Long-Term Effectiveness and Permanence
5.5 Reduction of Toxicity, Mobility, or Volume through Treatment
5.6 Short-Term Effectiveness
5.7 Implementability
5.8 Cost

8.0 Task 4: Supplemental Characterization

As provided in Attachment B (Schedule of Major Deliverables), Kerr-McGee shall submit to USEPA, for review, supplemental characterization data for the areas within Reach 8 of the Kress Creek Site that require additional characterization work during fall 2003 and early 2004. The submittal shall fully describe the work conducted and the findings of the characterization work and shall supplement the characterization report prepared for all other previously-characterized portions of the Kress Creek Site. The characterization work for Reach 8 will use methods consistent with those used to characterize Reaches 1 – 7.

9.0 Task 5: Progress Reports

Kerr-McGee shall submit monthly written progress reports to USEPA and the State agencies concerning actions taken pursuant to the AOC and this SOW. The progress reports shall be submitted on or before the 10th day of each month following the effective date of the AOC until the termination of the AOC, unless otherwise directed in writing by USEPA. These reports shall include, but are not limited to, a description of all significant developments during the preceding period, including specific work that was performed and any problems that were encountered, and the developments anticipated during the next reporting period including scheduling of work to be performed, anticipated problems, and actual or planned resolutions of past or anticipated problems.

ATTACHMENT A
PARTIAL LIST OF GUIDANCE

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RI/FS process.

The (revised) National Contingency Plan.

Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, U.S. EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9355.3-01, EPA/540/G-89/004, October 1988.

A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, U.S. EPA, Office of Solid Waste and Emergency Response, OSWER Directive No. 9200.1-23P, EPA 540-R-98-031, July 1999.

Role of Background in the CERCLA Cleanup Program, U.S. EPA, OSWER 9285.6-07P, April 26, 2002.

Soil Screening Guidance: User's Guide, U.S. EPA, OSWER Publication 9355.4-23, July 1996.

Soil Screening Guidance: Technical Background Document, U.S. EPA, EPA/540/R95/128, May 1996.

Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (Peer Review Draft), U.S. EPA, OSWER Publication 9355.4-24, March 2001.

CERCLA Compliance with Other Laws Manual, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9234.1-01 and -02, EPA/540/G-89/009, August 1988.

Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, U.S. EPA, Office of Emergency and Remedial Response, (Interim Final), OSWER Directive No. 9283.1-2, EPA/540/G-88/003, December 1988.

Considerations in Ground-Water Remediation at Superfund Sites and RCRA Facilities – Update, U.S. EPA, OSWER Directive 9283.1-06, May 27, 1992.

Pump-and-Treat Ground-Water Remediation A Guide for Decision Makers and Practitioners, U.S. EPA, EPA/625/R-95/005, July 1996.

Ground-Water Treatment Technology Resource Guide, U.S. EPA, OSWER, EPA-542-B-94/009, September 1994.

Land Use in the CERCLA Remedy Selection Process, U.S. EPA, OSWER Directive No. 9355.7-04, May 25, 1995.

Reuse Assessments: A Tool To Implement The Superfund Land Use Directive, U.S. EPA, OSWER 9355.7-06P, June 4, 2001.

Reusing Superfund Sites: Commercial Use Where Waste is Left on Site, U.S. EPA, OSWER 9230.0-100, February 2002.

Covers for Uncontrolled Hazardous Waste Sites, U.S. EPA, EPA/540/2-85/002, 1985.

Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites, U.S. EPA OSWER Directive 9285.6-08, February 12, 2002.

Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups, U.S. EPA, OSWER 9355.0-74FS-P, EPA/540-F-00-005, September 29, 2000.

Health and Safety Requirements of Employees Employed in Field Activities, U.S. EPA, Office of Emergency and Remedial Response, EPA Order No. 1440.2, July 12, 1981.

OSHA Regulations in 29 CFR 1910.120, Federal Register 45654, December 19, 1986.

Standard Operating Safety Guides, PB92-963414, June 1992.

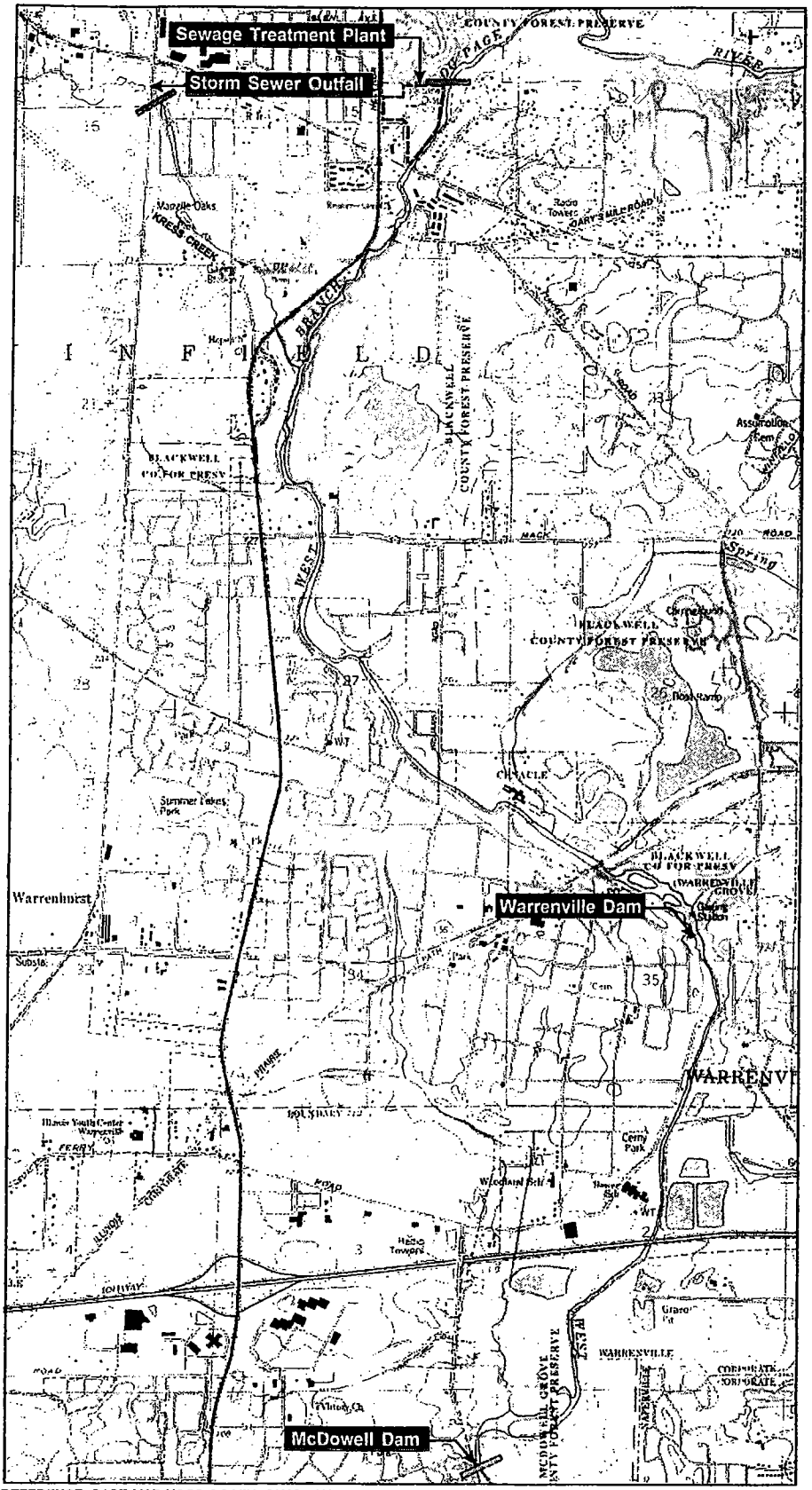
Community Relations in Superfund: A Handbook, U.S. EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9230.0#3B June 1988; and OSWER Directive No. 9230.0-3C, January 1992.

ATTACHMENT B
SCHEDULE OF MAJOR DELIVERABLES

Deliverable	Due Date
RI Report	
Draft RI Report	December 3, 2003
Final RI Report	[21] calendar days after receipt of USEPA's notification of revisions on the Draft RI Report
FS Report	
Draft FS Report	December 3, 2003
Final FS Report	[21] calendar days after receipt of USEPA's notification of revisions on the Draft FS Report
Reach 8 Submittal	
Supplemental Characterization Data for Reach 8	December 31, 2004

Figures

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers & scientists



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., NAPERVILLE, ILL., 1993.

2000' 0 2000'

Approximate Scale: 1" = 2000'

LEGEND:

= Indicates Upstream Limit

= Indicates Downstream Limit

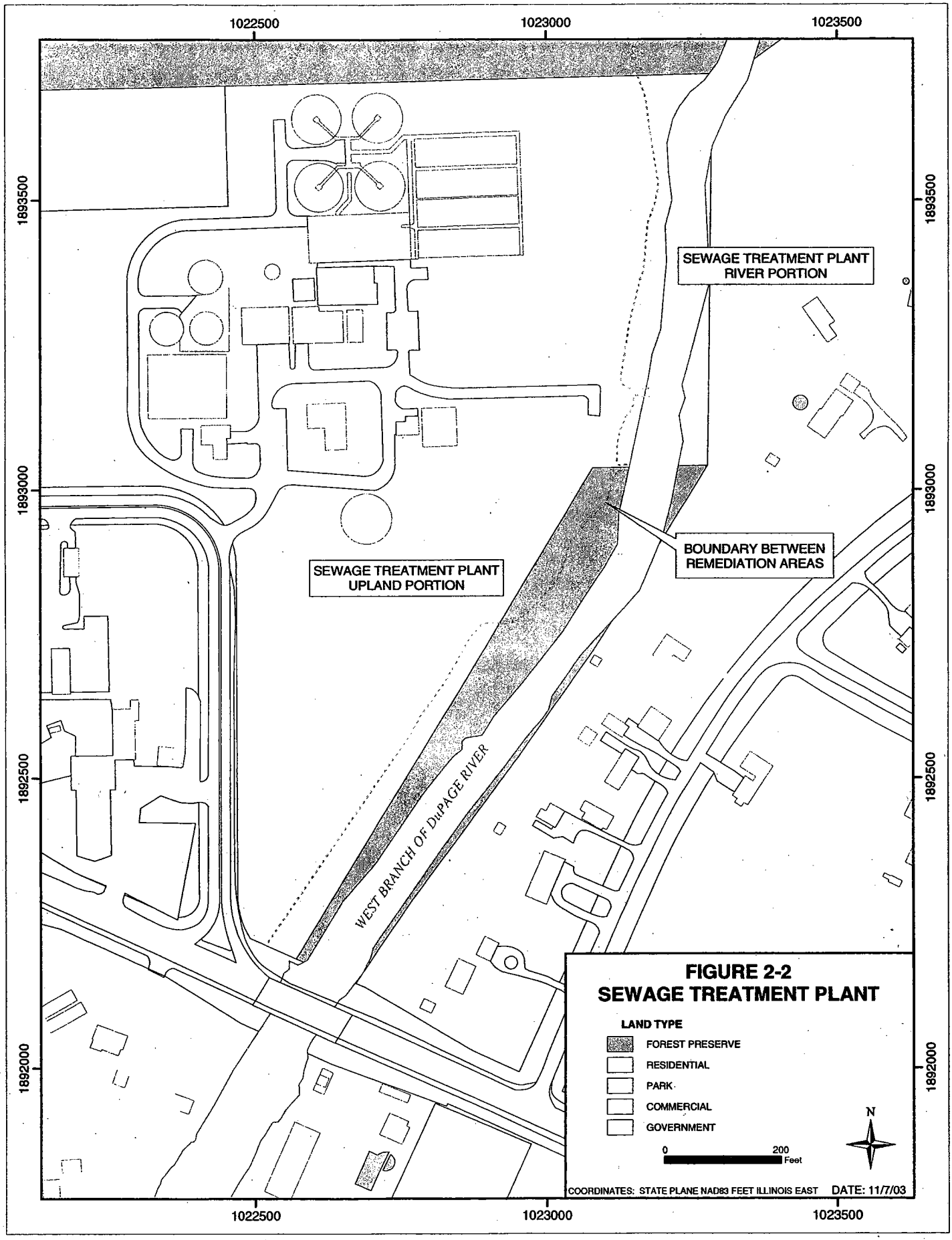
KERR-MCGEE CHEMICAL LLC
KRESS CREEK/WEST BRANCH DUPAGE RIVER AND
SEWAGE TREATMENT PLANT SITES
RI/FS STATEMENT OF WORK

SITE LOCATION MAP

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE 2-1

11/11/03 SYR-D85-DJH
71004010/71004n01.cdr


1022500
1023000
1023500
1893500
1893000
1892500
1892000
SEWAGE TREATMENT PLANT
RIVER PORTION
SEWAGE TREATMENT PLANT
UPLAND PORTION
BOUNDARY BETWEEN
REMEDIATION AREAS
WEST BRANCH OF DuPAGE RIVER
FIGURE 2-2
SEWAGE TREATMENT PLANT
LAND TYPE
FOREST PRESERVE
RESIDENTIAL
PARK
COMMERCIAL
GOVERNMENT
N
0
200
Feet
COORDINATES: STATE PLANE NAD83 FEET ILLINOIS EAST
DATE: 11/7/03

Consent Decree in the matter of United States and Illinois v. Kerr-McGee Chemical LLC, relating to the Kerr-McGee West Chicago NPL Sites.

APPENDIX H

RKP SITE RECORD OF DECISION

Reed-Keppler Park

Record of Decision

West Chicago, Illinois

United States
Environmental Protection Agency

Region 5

September 2002

TABLE OF CONTENTS

FIGURES

This Record of Decision (ROD) documents the remedy selected for the Reed-Keppler Park (RKP) site in West Chicago, DuPage County, Illinois. This ROD is organized in three sections: a *Declaration*, a *Decision Summary*, and a *Responsiveness Summary*.

1.0 DECLARATION

This section summarizes the information presented in the ROD and includes the authorizing signature page.

1.1 Site Name and Location

The RKP site is a 100-acre community park located in the northwestern portion of West Chicago, DuPage County, Illinois. West Chicago, Illinois, is located about 30 miles west of Chicago, Illinois. The RKP site is located north of National Street and west of Arbor Avenue. The majority of the RKP site is owned by the City of West Chicago, and is leased to and operated by the West Chicago Park District (Park District) for use as a public recreation area. The park is used for a variety of activities including tennis, swimming, volleyball, soccer, and baseball/softball. Land use within one mile of the site is primarily residential. The Park District's Family Aquatic Center is also located in the northeast section of the RKP site.

1.2 Basis and Purpose

This decision document presents the selected remedy for the RKP site in West Chicago, Illinois. The remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Contingency Plan (NCP). Information used to select the remedy is contained in the Administrative Record file for the site. The file is available for review at the US EPA Region 5 Records Center, 77 West Jackson Boulevard, Chicago, Illinois, and at the West Chicago Public Library, located at 118 West Washington Street, West Chicago, Illinois.

The State of Illinois concurs with the selected remedy.

1.3 Description of Selected Remedy

The selected remedy for the RKP site is No Further Action, along with monitoring to insure that future concentrations of total uranium in the RKP site groundwater meet the Maximum Contaminant Level (MCL) drinking water standard of 30 micrograms per liter (ug/L), which is equivalent to 27 picoCuries per liter (pCi/L). This monitoring will continue in all nine existing site monitoring wells until it has been demonstrated that the MCLs have been achieved, and maintained, for three consecutive sampling events.

The expected cost to implement this selected remedy is $15,000 per sampling event, to pay for the collection and analysis of nine groundwater samples from the RKP site for total uranium. Groundwater sampling will be conducted semi-annually (twice per year) initially, resulting in an annual cost of $30,000. Sampling frequency may be increased, or decreased, based upon the results from future sampling events. Also, because this remedy results in contaminants remaining at the site above MCLs, US EPA will review this action no less often than every five years after the date of this Record of Decision.

The RKP site is being addressed as one operable unit under the CERCLA framework. This operable unit encompasses both soil and groundwater at the site. Therefore, the selected remedy specified in this Record of Decision will serve as the final action for the entire RKP site.

1.4 Statutory Determinations

US EPA has determined that no further remedial action is necessary at the RKP site. US EPA issued an Action Memorandum for the RKP site in 1996, which reported that the median level of soil contamination, based upon soil samples collected at RKP, was 286 picoCuries per gram (pCi/g) of total radium, with a maximum exceeding 15,000 pCi/g. The Action Memorandum concluded that contaminated soil should be removed until a cleanup criterion of 5 pCi/g of total radium (radium-226 + radium-228) over background was achieved. The background concentration for the RKP site was determined to be 2.2 pCi/g, thereby establishing the cleanup criterion for the RKP site at 7.2 pCi/g.

Kerr-McGee Chemical Limited Liability Company (Kerr-McGee) performed the excavation and restoration work of a time-critical removal action at the RKP site from April 1997 to November 2000. The soil contaminated above the cleanup criterion has been successfully removed from the site. Since exposure to the cleanup criterion of 7.2 pCi/g does not represent an unacceptable risk to human health, no further action is necessary to protect the public health or the environment at the RKP site. The sole remaining remediation objective is to insure that future concentrations of total dissolved uranium in RKP groundwater comply with the drinking water standard for total uranium promulgated on December 7, 2000, in 65 FR 76708, *National Primary Drinking Water Regulations.*

1.5 Authorizing Signatures

William E. Muno, Director
Superfund Division
United States Environmental Protection Agency, Region 5

9/13/02
Date

1.6 Support Agency Acceptance

The Illinois EPA has provided their formal concurrence with the selected remedy in a letter to US EPA, a copy of which is attached in Appendix A.

2.0 DECISION SUMMARY

2.1 Site Description

The RKP site is a 100-acre community park located in the northwestern portion of West Chicago, DuPage County, Illinois, as shown in Figure 1.1 on page 4. West Chicago, Illinois, is located about 30 miles west of Chicago, Illinois. The RKP site is located north of National Street and west of Arbor Avenue. The majority of the RKP site is owned by the City of West Chicago, and is leased to and operated by the West Chicago Park District (Park District) for use as a public recreation area. The park is used for a variety of activities including tennis, swimming, volleyball, soccer, and baseball/softball. Land use within one mile of the site is primarily residential. The Park District's Family Aquatic Center is also located in the northeast section of the RKP site.

Much of the focus at the RKP site is on a 1-acre area within the park, which represented a historical sand and gravel quarry. In the early 1900's, the RKP site was mined as a quarry to provide rock and embankment material for construction of the Chicago, Wheaton and Western Railway (now the Illinois Prairie Path embankment owned by Commonwealth Edison). This Old Quarry Area was left as a topographic low area and was subsequently opened to solid waste (household and commercial garbage) disposal. Aerial photographs taken as early as 1939 show significant waste disposal activity occurring in five distinct areas in the Old Quarry Area. By 1954, the five dumping centers present in 1939 had been reduced to one landfill-like zone reached via a haul road off the main park road. The last aerial photograph that shows any dumping activity was taken in 1967, although US EPA obtained testimony that thorium tailings were dumped in Reed-Keppler Park in 1972 and 1973. A 1974 aerial photograph shows that all landfilling operations had ceased, and a maintenance building had been constructed to the west of the Old Quarry Area.

Among the solid wastes found at the RKP site were thorium mill tailings generated at the West Chicago Rare Earths Facility (REF), operated in West Chicago by Lindsay Light and Chemical Company, and its successors, from 1934 until 1973. The REF produced radioactive elements, such as thorium, radium and uranium, along with gas lantern mantles, for private entities and the United States government's use in Federal atomic energy programs. Production of these radioactive elements resulted in the generation of radioactive mill tailings. The REF produced these elements by extracting them from monazite ore sands, bastnasite, fluorspar and other ores using an acid leaching process. The processed sands, or "tailings," retained residual levels of thorium, radium and uranium, as well as, certain other insoluble metals. In the earlier years of operation, the potential hazards of these tailings were not generally recognized. Some of these tailings were apparently used as fill material at the RKP site. In 1967, Kerr-McGee purchased the REF and maintained operations until the facility was closed in 1973.

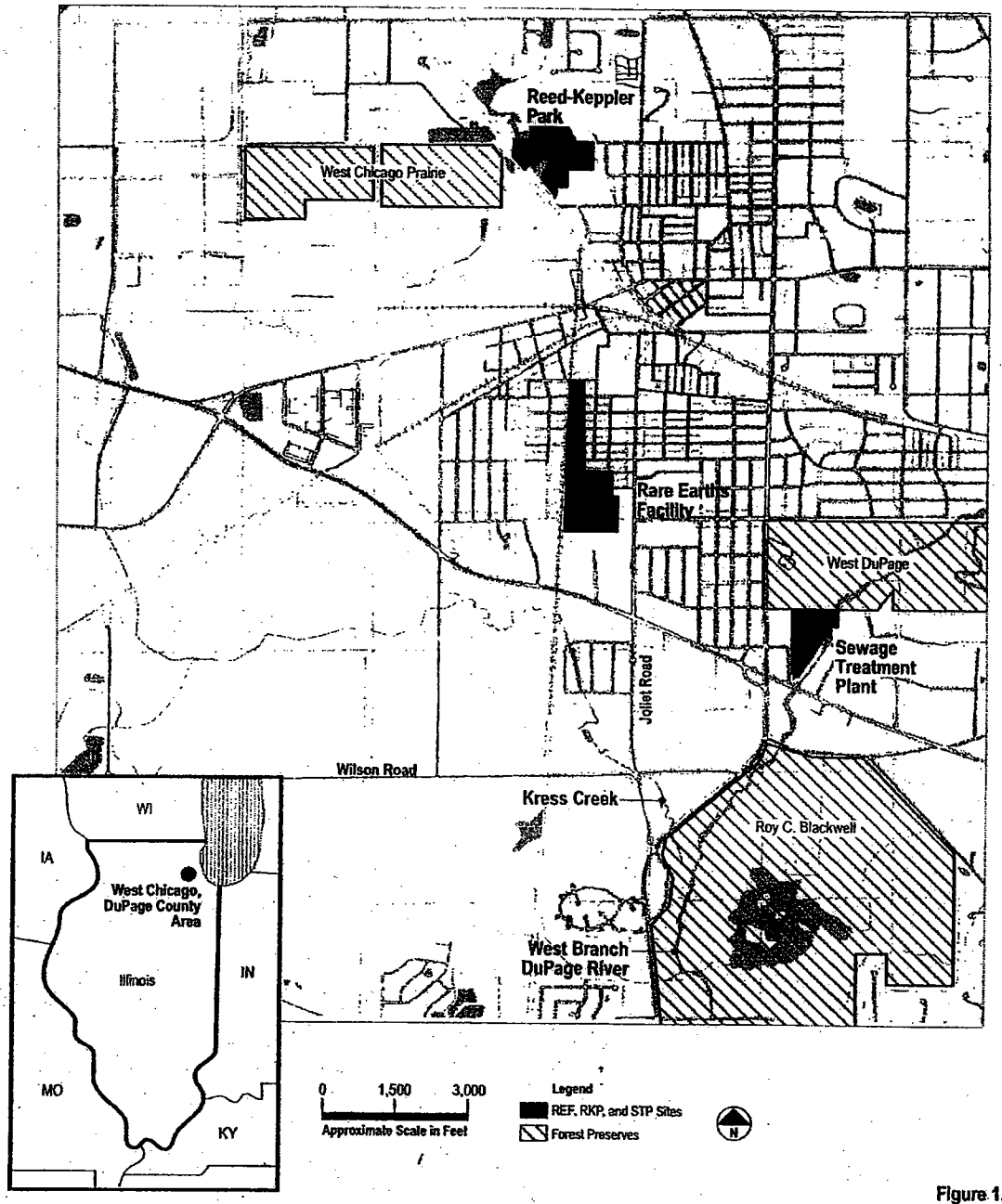


Figure 1.1
Site Location Map
Reed Keppler Park RI

2.2 Site History and Enforcement Activities

Radioactivity surveys were performed at the RKP site by the Nuclear Regulatory Commission (NRC) and the US EPA, which resulted in the RKP site being placed on the National Priorities List (NPL) in 1990. Several supplemental investigations were conducted, and, in 1996, US EPA determined that the level of contamination in the surface soils at RKP warranted a time-critical removal action. The need for the time-critical removal of radioactively contaminated materials from the site is documented in an Action Memorandum. The Action Memorandum reported that the median level of soil contamination, based upon soil samples collected at RKP, was 286 picoCuries per gram (pCi/g) of total radium, with a maximum exceeding 15,000 pCi/g. The Action Memorandum concluded that contaminated soil should be removed until a cleanup criterion of 5 pCi/g of total radium (radium-226 + radium-228) over background was achieved. The background concentration for the RKP site was determined to be 2.2 pCi/g, thereby establishing the cleanup criterion for the RKP site at 7.2 pCi/g. The Action Memorandum, along with an Action Criteria Document that explained the radiation cleanup level, formed the basis for US EPA's Unilateral Administrative Order (UAO), which required Kerr-McGee and the City of West Chicago, Illinois, to conduct removal activities at the RKP site to address the radioactive contamination and protect human health and the environment.

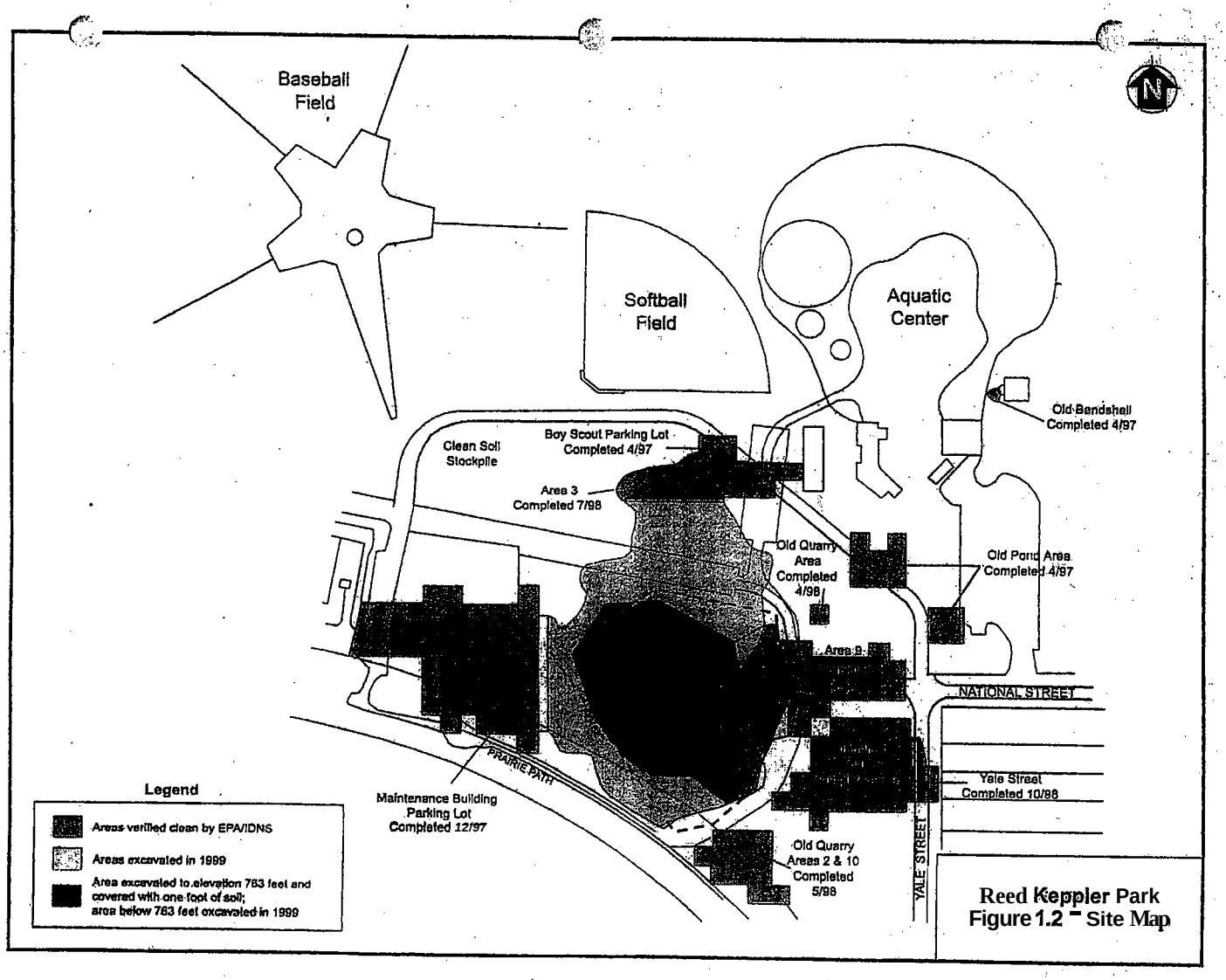
The excavation of the RKP site was divided into several different excavation areas. Figure 1.2, on page 6, is a site map that shows the excavation areas of the RKP site. These excavation areas are described below, along with chronological initiation and completion dates:

- Excavation activities at the Band Shell, Old Pond and Tennis Courts were initiated in April 1997. These three excavations were completed in June 1997, and the interim restoration activities were completed by August 1997.

- Excavation activities at the Boy Scout parking lot were started in September 1997. This excavation was completed in October 1997, and interim restoration was completed in December 1997.

- Excavation at the Maintenance Building parking lot was initiated in September 1997. This excavation was completed in December 1997, and interim restoration was completed in January 1998.

- By far, the largest area excavated was the Old Quarry Area. The site preparation activities started there in January 1998. Excavation activities at the Old Quarry Area extended below the water table. Excavation of material above the water table began in 1998, and the removal of material below the water table began in July 1999. Verification below the water table consisted of ensuring that a predetermined depth (based on data collected previously through borehole gamma logging) had been reached using common land surveying techniques. The excavation below the water table was completed in


Baseball Field
Softball Field
Aquatic Center
N
Old Bandshell Completed 4/97
Clean Soil Stockpile
Boy Scout Parking Lot Completed 4/97
Area 3 Completed 7/98
Old Quarry Area Completed 4/98
Old Pond Area Completed 4/97
Area 9
NATIONAL STREET
PRAIRIE PATH
Maintenance Building Parking Lot Completed 12/97
Yale Street Completed 10/98
Old Quarry Areas 2 & 10 Completed 5/98
YALE STREET
Legend
Areas verified clean by EPA/IDNS
Areas excavated in 1999
Area excavated to elevation 783 feet and covered with one foot of soil; area below 783 feet excavated in 1999
Reed Keppler Park
Figure 1.2 - Site Map

August 1999. Backfilling of the Old Quarry Area excavation followed immediately behind the excavation, with the placement of rock below the water table and the placement of segregated clean soil cover above the rock. All segregated clean soil was placed a minimum of three feet below the final cover grades. Placement of imported backfill to within six inches of final grade was then completed in December 1999.

Final restoration activities for the RKP site were completed in November 2000. A total of 114,652 loose cubic yards of contaminated material were removed from the RKP site between April 1997 and October 1999. These materials were then shipped to the REF facility for separation of clean material from contaminated material, which was shipped to an NRC licensed disposal site. A Final Report for the RKP removal action was submitted to US EPA in April 2002, which confirms that the removal action met all of the requirements and cleanup criteria specified in the Action Memorandum and the Action Criterion Document for the RKP site.

2.3 Community Participation

The Proposed Plan for Reed-Keppler Park was made available to the public for comment on May 6, 2002. Copies were placed in the Administrative Record file, located at the US EPA Records Center, 77 West Jackson Boulevard, Chicago, Illinois, and at the local repository, located at the West Chicago Public Library, 118 West Washington Street, West Chicago, Illinois, before the start of the 30-day public comment period. Copies were also distributed to forum members participating at the Intergovernmental Forum meeting on April 26, 2002. The notice of the availability of the plan was published in the ***Daily Herald*** on May 5, 2002. A public comment period was held from May 6, 2002 to June 6, 2002. In addition, a public meeting was held on May 16, 2002, at the West Chicago City Hall, to present the Proposed Plan. The notice announcing the public meeting was published in the ***Daily Herald*** on May 15, 2002. Representatives of US EPA and the Illinois EPA were present at the public meeting to answer questions regarding the proposed remedy. Responses to comments received during the comment period and public meeting are included in the Responsiveness Summary, which is Section 3.0 of this ROD.

2.4 Scope and Role of Operable Unit

The RKP site is being addressed as one operable unit under the CERCLA framework. This operable unit encompasses both soil and groundwater at the site. Therefore, the selected remedy specified in this ROD will serve as the final action for the entire RKP site.

2.5 Site Characteristics

US EPA has determined that all action necessary to protect human health and the environment has been taken with respect to the soils at the RKP site. More information on the successful completion of the soil removal action at RKP can be found in Section 2.2 of this ROD and in the *Removal Report for the Reed-Keppler Park Site,* dated April 2002.

Groundwater data were collected in 1994 and 1997 at RKP as part of investigation efforts at the site. Figure 2, below, shows the current locations of RKP monitoring wells, along with the historical locations of Monitoring Well #4 (MW-4) and Monitoring Well #5 (MW-5). Concentrations of total dissolved uranium, elevated above background, were detected in MW-4 and MW-5 in October 1994. These wells are shown on the Figure below, but they were abandoned during site excavation and are no longer in existence. The total dissolved uranium concentrations at that time were 56.5 and 34.9 picoCuries per liter (pCi/L), respectively. MW-4 and MW-5 again showed elevated concentrations in 1997 with the dissolved concentrations of total uranium at 64.8 pCi/L in MW-4 and 32.6 pCi/L in MW-5. MW-4 and MW-5, along with MW-1, MW-2 and MW-3, were subsequently abandoned or removed from the site during excavation of contaminated soil.

Kerr-McGee installed five new monitoring wells (numbered RKP #1 to #5) at the RKP site in November 1997. Monitoring Wells #7-9 were also subsequently installed to replace some of the original site wells that had been removed as part of site excavation activities.

In August 2001, additional RKP groundwater samples were collected from the nine existing RKP wells (RKP#1-5 and MW #6-9) to determine if residual groundwater contamination levels achieved the remedial objective (drinking water standard) following completion of the removal action at the RKP site. One well (RKP-5) exhibited concentrations of total uranium in exceedance of the drinking water standard for total uranium in 40 CFR 141. This standard, also known as the Maximum Contaminant Level (MCL), is 30 micrograms per liter (ug/L) for total uranium. This corresponds to a radioactivity level of 27 picoCuries per liter (pCi/L). The

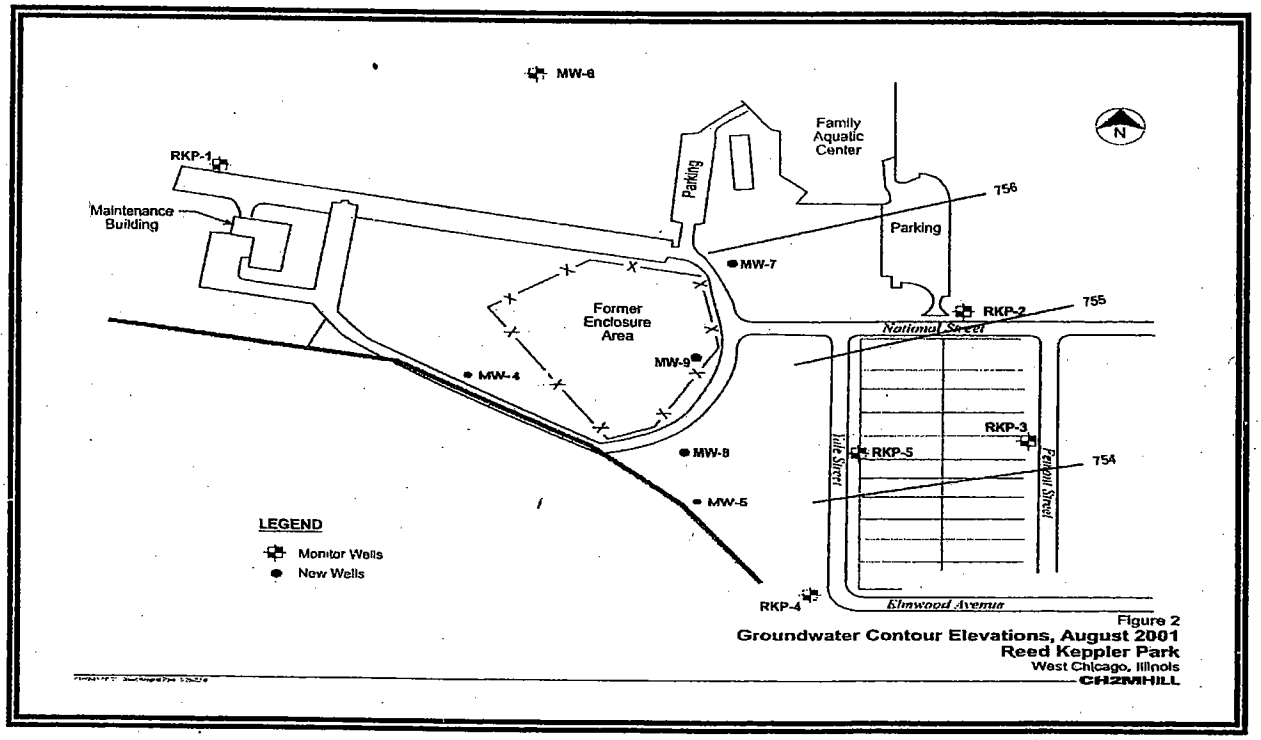


Figure 2
Groundwater Contour Elevations, August 2001
Reed Keppler Park
West Chicago, Illinois
CH2MHILL

concentration of uranium in RKP-5 in August 2001 was 37.1 pCi/L, in exceedance of the 27 pCi/L standard. All of the other RKP monitoring wells were in compliance with the MCL.

US EPA cleanups conducted under CERCLA are legally required to comply with all Applicable or Relevant and Appropriate Requirements (ARARs). The MCLs in the Safe Drinking Water Act are considered an ARAR for all CERCLA sites that overlie aquifers that are used, or may be reasonably anticipated to be used, as a drinking water source in the future. US EPA promulgated the MCL for total uranium in 65 FR 76708, *National Primary Drinking Water Regulations*, on December 7, 2000. The State of Illinois has designated the groundwater aquifer underlying RKP and the City of West Chicago as Class I - Potential Potable Groundwater Resource.

Due to the exceedance of the drinking water standard for uranium in monitoring well RKP-5, at the RKP site, US EPA intends to require monitoring of the nine site wells until sufficient data is collected to insure that all groundwater concentrations are decreasing and that the drinking water standard for uranium in 40 CFR Part 141 (30 ug/L or 27 pCi/L) has been attained in all site wells. US EPA does not expect that active treatment of the groundwater underlying the RKP site will be required for the following reasons:

1) The source of the uranium contamination (the radioactively contaminated surface and subsurface soils at the RKP site) has been removed as part of the removal action, conducted by Kerr-McGee from 1997 to 2000. Therefore, there is no continuing source of uranium in the soil to leach to groundwater and cause the concentrations in groundwater to increase.

2) Only one of the nine wells at the RKP site (RKP-5) exhibits groundwater contamination above the MCL drinking water standard for uranium (30 ug/L or 27 pCi/L). Six of the nine RKP monitoring wells are located in areas that are considered downgradient from the former quarry and landfill areas at the site. RKP-5 was also sampled in January 1998, and the concentration of uranium in the well at that time was 7.43 pCi/L, which is below the MCL. Because RKP-5 was in compliance with the MCL when it was sampled in 1998, and because of the fact that the result in August 2001 is only marginally above the MCL, there is a high probability that the 37.1 pCi/L result is an isolated sample result that will diminish within a reasonable time. In fact, beginning in December 1997, a total of 15 samples have been collected from the nine RKP groundwater wells, and the 37.1 pCi/L result from RKP-5 in August 2001 is the only exceedance of the MCL in the data set.

3) Although the shallow aquifer underlying the RKP site is considered a potential drinking water source, there are currently City of West Chicago restrictions that prohibit use of the groundwater at the site. In addition, the City of West Chicago obtains its drinking water from a total of nine operational wells, two of which are in the vicinity of RKP. These wells are screened in a deep aquifer system, which is separated from the shallow aquifer by a Silurian dolomite and Maquoketa shale layer that inhibits the vertical

flow of groundwater from the upper aquifer to the underlying formation. Therefore, it is extremely unlikely that surficial contaminants could migrate to the draw zones of the City wells. Shallow groundwater in the vicinity of the RKP site is not used as a drinking water source. Since there is no known conduit between aquifers, and since site related contaminants have not been detected in any of the nine City wells above background concentrations, there is no reason to believe that a complete pathway to human receptors currently exists, nor is one expected to form given the City of West Chicago's ordinance prohibiting use of groundwater in the area.

2.6 Current and Potential Future Site and Resource Uses

The majority of the RKP site is owned by the City of West Chicago, and is leased to and operated by the West Chicago Park District (Park District) for use as a public recreation area. The park is used for a variety of activities including tennis, swimming, volleyball, soccer, and baseball/softball. Land use within one mile of the site includes residential housing. The Park District's Family Aquatic Center is also located in the northeast section of the RKP site. There are no restrictions being placed on the use of the property because the soil removal action conducted by Kerr-McGee from 1997 to 2000 resulted in a concentration of radium in soil that is considered protective of human health and the environment.

Although the shallow aquifer underlying the RKP site is considered a potential drinking water source, there are currently City of West Chicago restrictions that prohibit use of the groundwater at the site. In addition, the City of West Chicago obtains its drinking water from a total of nine operational wells, two of which are in the vicinity of RKP. These wells are screened in a deep aquifer system, which is separated from the shallow aquifer by a physical layer composed of Silurian dolomite and Maquoketa shale. This layer inhibits the vertical flow of groundwater from the upper aquifer to the underlying formation. Therefore, it is extremely unlikely that surficial contaminants could migrate to the draw zones of the City wells. Shallow groundwater in the vicinity of the RKP site is not used as a drinking water source. Since there is no known conduit between aquifers, and since site-related contaminants have not been detected in any of the nine City wells above background concentrations, there is no reason to believe that a complete pathway to human receptors currently exists, nor is one expected to form given the City of West Chicago's ordinance prohibiting use of groundwater in the area.

2.7 Site Risks

In order to determine the need for a removal action to address contamination at the RKP site, US EPA conducted a baseline human health and screening level ecological risk assessment in 1996. Risks were quantified for both carcinogenic and non-carcinogenic contaminants. The risk associated with the intake of a known, or suspected, carcinogen is reported in terms of the incremental lifetime cancer risk presented by that contaminant of concern, as estimated using the appropriate slope factor, and the amount of material available for uptake. The acceptable risk range, as defined by CERCLA and the National Contingency Plan (NCP), is 1×10^{-4} to 1×10^{-6}

(one human in ten thousand to one human in one million incremental cancer incidence). Potential human health hazards from exposure to non-carcinogenic contaminants are evaluated using a Hazard Quotient (HQ). The HQ is determined by the ratio of the intake of a contaminant of concern to a reference dose, or concentration for the contaminant of concern that is believed to represent a no observable effect level. The specific HQ for each contaminant of concern is then summed to provide an overall Hazard Index (HI). EPA guidance sets a limit of 1.0 for the comprehensive HI.

The conclusion from the 1996 baseline risk assessment was that, for all scenarios considered (construction worker, maintenance worker and recreational visitor), the risks associated with radionuclides in surface soil, subsurface soil, or sediments exceeded the limit of the acceptable CERCLA risk range of 1×10^{-4}. Risks associated with surface soil in the enclosure area of the RKP site exceeded 1×10^{-2}. More detailed information with respect to how this risk was calculated can be found in the *Remedial Investigation Report, Kerr-McGee Reed-Keppler Park Site, March 21, 2002.* This risk assessment led to the conclusion by US EPA that an immediate response was necessary to minimize potential exposures and risks to the population surrounding the RKP site and to park visitors. US EPA issued a UAO to Kerr-McGee and the City of West Chicago, Illinois, in March 1996 to require immediate removal of the radioactively contaminated surface and subsurface soils at RKP. Since the removal action successfully achieved the cleanup standard of 7.2 pCi/g for total radium, exposure to RKP site soils is now considered protective for human health.

As part of the Remedial Investigation of the RKP site, a baseline screening ecological risk assessment was also conducted, in order to determine the need to address significant adverse ecological effects at the RKP site. The results of the ecological risk assessment showed slight exceedances of the target HQ of 1.0, in the 2 to 7 range, due to organic compounds and metals in site soil and sediments. More detailed information with respect to how the HQ was calculated, and how it was compared to the target HQ, can be found in the *Remedial Investigation Report, Kerr-McGee Reed-Keppler Park Site, March 21, 2002.* Due to the fact that the ecological screening assessment was considered to be extremely conservative, the exceedances were considered minor and did not warrant a more detailed analysis of ecological risks at RKP. In any event, the removal action, conducted by Kerr-McGee, resulted in these organic compounds and metals being removed from the site soil and sediment down to levels that are considered to be protective of the ecological environment.

2.8 Remediation Objectives

The removal action conducted at the RKP site has already achieved the cleanup objectives for soil, as specified in the Action Memorandum and Action Criteria Document for the site. The sole remaining remedial objective is to insure that future concentrations of total dissolved uranium in RKP groundwater comply with the drinking water standard for total uranium promulgated on December 7, 2000, in 65 FR 76708, *National Primary Drinking Water Regulations.* This rule established an MCL for total dissolved uranium at 30 ug/L. For the MCL

rulemaking, US EPA assumed a typical conversion factor of 0.9 pCi/ug for the mix of uranium isotopes found in public water systems. This converts the mass concentration of uranium in groundwater to an equivalent "activity" level, which relates to the radioactive decay of uranium. The 0.9 pCi/ug conversion factor results in an activity - based drinking water standard of 27 pCi/L.

2.9 Description of Alternatives

Alternative #1: No Further Action

Estimated Capital Cost:	*$0*
Estimated Annual O&M Costs:	*$0*
Estimated Months to Construct:	*none*

Regulations governing the Superfund program require that the "No Action" alternative be evaluated at each site to establish a baseline for comparison. Under this alternative, no further action would be taken to address residual contamination levels in soil or groundwater at the RKP site.

Alternative #2: No Further Action with Associated Groundwater Monitoring

Estimated Capital Cost:	*$0*
Estimated Annual O&M Costs:	*$30,000*
Estimated Months to Construct:	*none, the wells required for monitoring are already in place at the RKP site*

Under this alternative, US EPA asserts that all action necessary to protect human health and the environment has been taken with respect to the soils at the RKP site. More information on the successful completion of the soil removal action at RKP can be found in the *Final Removal Report for the Reed-Keppler Park Site,* dated April 2002. However, due to an exceedance of the drinking water standard for uranium in one of the nine existing groundwater wells at the site, US EPA intends to require monitoring of the nine site wells until sufficient data is collected to insure that all groundwater concentrations are decreasing and that the drinking water standard for uranium in 40 CFR Part 141 (30 ug/L or 27 pCi/L) has been attained in all site wells.

In the unlikely event that total uranium concentrations in RKP groundwater fail to decrease, or if they continue to increase, in the future, more active remediation methods will be considered for the groundwater at RKP.

2.10 Comparative Analysis of Alternatives

Nine criteria are used to evaluate the different remediation alternatives individually, and against each other, in order to select a remedy. The nine evaluation criteria are (1) overall protection of

human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility or volume of contaminants through treatment; (5) short-term effectiveness; (6) implementability; (7) cost; (8) State/support agency acceptance; and (9) community acceptance. This section of the ROD profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. A description of the nine evaluation criteria, and how they relate to the alternatives considered, follows:

2.10.1 Threshold Criteria: Must be met for an alternative to be eligible for selection

Criterion 1: Overall Protection of human health and the environment

This criterion addresses whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment. Alternatives #1 and #2 meet the criteria for protection of human health and the environment, as the unacceptable risks posed by the soil contamination at the RKP site were addressed during the time-critical removal action conducted by Kerr-McGee, pursuant to the UAO and Action Memorandum for the RKP site. All residual soil contamination concentrations meet the cleanup standard of 7.2 pCi/g for total radium (radium-226 and radium-228), which is considered to be protective of human health and the environment. There is no current pathway for exposure to groundwater at the RKP site for area residents, and a City of West Chicago ordinance prohibits the installation of wells in this vicinity. For these reasons, RKP groundwater is also protective from a potential risk standpoint.

Criterion 2: Compliance with applicable or relevant and appropriate requirements

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites attain legally applicable, or relevant and appropriate, Federal and State requirements, standards, criteria, and limitations that are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4). Compliance with ARARs addresses whether a remedy will meet all of the applicable, or relevant and appropriate requirements, of Federal and State environmental statutes.

Applicable Requirements are those substantive environmental protection requirements, standards, criteria, or limitations promulgated under Federal or State law that specifically address hazardous substances, the remedial action to be implemented at the site, or other circumstances present at the site. Relevant and Appropriate Requirements are those substantive environmental protection requirements, standards, criteria, or limitations promulgated under Federal or State law which, while not applicable to the hazardous materials found at the site, the remedial action itself, the site location, or other circumstances at the site, nevertheless address problems or situations sufficiently similar to those encountered at the site that their use is well-suited to the site.

ARARs are of three types. They are chemical-specific, location-specific, and/or action-specific:

Chemical-specific ARARs are usually health or risk-based numerical values, or methodologies, which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount, or concentration, of a chemical that may be found in, or discharged to, the ambient environment. For the RKP site, "Maximum Contaminant Levels", or "MCLs", established under the Safe Drinking Water Act, constitute chemical-specific ARARs. They apply to the groundwater beneath the RKP site, as well as, areas downgradient of the site that may have been affected by site contamination. Both Alternative #1 and Alternative #2 will meet this ARAR, but US EPA prefers Alternative #2 because monitoring of the site groundwater is required to demonstrate that all of the RKP monitoring wells will meet the MCL drinking water standards in 40 CFR 141 in the future.

Location-specific ARARs are restrictions placed on the concentration of hazardous substances, or the conduct of activities, solely because they are located in specific locations, e.g. flood plains, wetlands, historic places, etc. For the RKP site, no location-specific ARARs have been identified that would affect the selected alternative.

Action-specific ARARs are usually technology or activity-based requirements, or limitations, on actions taken with respect to hazardous wastes. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy. In the case of the RKP site, no active remediation is being considered. Therefore there are no action-specific ARARs to consider with respect to the selected alternative.

2.10.2 Balancing Criteria: Used to weigh major trade-offs among alternatives

Criterion 3: Long-term effectiveness and permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time. Only Alternative #2 provides some degree of long-term protectiveness. The implementation of groundwater monitoring at the RKP site is necessary to ensure that future concentrations of uranium in groundwater are decreasing until they are in compliance with the drinking water standard in 40 CFR 141.

Criterion 4: Reduction of toxicity, mobility or volume through treatment

Reduction of toxicity, mobility or volume through treatment refers to the anticipated performance of the treatment technologies in reducing the harmful effects of principal contaminants, reducing their ability to move in the environment, and reducing the amount of contamination present. Since neither of the alternatives includes treatment, this criterion does not require further evaluation. All necessary remediation at the RKP site was accomplished previously, as part of the removal action conducted by Kerr-McGee.

Criterion 5: Short-term effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy, and any adverse impacts that may be posed to workers and the community during construction and operation of the remedy until clean-up goals are achieved. Both of the alternatives included in this Proposed Plan demonstrate short-term effectiveness. There is no construction time, or preparation time, required to implement groundwater monitoring at the RKP site, as the wells that are required to monitor site groundwater conditions are already in place. The site is currently protective of human health and the environment because there is presently no pathway from the groundwater contamination at RKP to any surrounding receptors. The purpose of the proposed monitoring is to insure that the uranium concentrations in groundwater eventually meet the drinking water standards and the protection of human health of the environment is maintained at RKP.

Criterion 6: Implementability

Implementability addresses the technical and administrative feasibility of implementing the alternative from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered. Since Alternative #1 involves no action, there is no time or cost required for implementation. Alternative #2, no further action with monitoring, requires no time to implement other than the usual amount of time required for groundwater sampling in the field (2-3 days).

Criterion 7: Cost

The range of costs is zero dollars ($0) for Alternative #1, No Action, to approximately $15,000 per sampling event for Alternative #2, the sampling and analysis of groundwater for total uranium from the nine RKP wells and comparison to the drinking water standard in 40 CFR 141. Groundwater sampling will be conducted semi-annually (twice per year) initially, resulting in an annual cost of $30,000. Sampling frequency may be increased, or decreased, based upon the results from future sampling events.

2.10.3 Modifying Criteria: To be considered after public comment is received on the Proposed Plan and of equal importance to the balancing criteria

Criterion 8: State/Support Agency Acceptance

US EPA, and the State of Illinois, believe that Alternative #1, No Further Action, *currently* provides adequate protection of human health and the environment. However, it could result in *future* unacceptable risks, since it would result in leaving uranium, in RKP groundwater, above the levels allowed by the drinking water standard in 40 CFR 141. Therefore, both agencies support the selected remedy, Alternative #2, which calls for no further action with monitoring, to

insure that uranium concentrations in the site groundwater meet the MCL in the future.

Criterion 9: Community Acceptance

This section considers whether the local community agrees with US EPA's analyses and Preferred Alternative. US EPA received seven comments on the Proposed Plan for the final remedy at RKP. Responses to these comments are included in the Responsiveness Summary, which is Section 3.0 of this ROD. None of the comments expressed disagreement with the selected remedy, and, in fact, several expressed support for the remedy US EPA is selecting in this ROD.

2.11 Selected Remedy

The Selected Remedy is Alternative #2, No Further Action, along with monitoring to insure that future concentrations of uranium in the RKP site groundwater meet the MCL drinking water standard of 30 ug/L, or 27 pCi/L. This monitoring will continue until it has been demonstrated that the MCLs have been achieved, and maintained, for three consecutive sampling events.

Expected cost to implement this selected remedy is $15,000 per sampling event, to pay for the collection and analysis of nine groundwater samples from the RKP site for total uranium. Groundwater sampling will be conducted semi-annually (twice per year) initially, resulting in an annual cost of $30,000. Sampling frequency may be increased, or decreased, based upon the results from future sampling events. Also, because this remedy results in contaminants remaining at the site above MCLs, US EPA will review this action no less often than every five years after the date of this Record of Decision.

In the unlikely event that total uranium concentrations in RKP groundwater fail to decrease, or if they continue to increase, in the future, more active remediation methods will be considered for the groundwater at RKP.

2.12 Documentation of Significant Changes

Although this ROD will be signed and finalized, new information may be received or generated that could affect the selected remedy. US EPA, as the lead agency for this ROD, has the responsibility to evaluate the significance of any such new information. The type of documentation required for a post-ROD change depends on the nature of the change. Three categories of changes are recognized by the US EPA: non-significant, significant, and fundamental. Non-significant post-ROD changes may be documented using a memo to the Administrative Record file. Changes that significantly affect the ROD must be evaluated pursuant to CERCLA Section 117 and the NCP at 40 CFR 300.435(c)(2)(I). Fundamental changes typically require a revised Proposed Plan and an amendment to the ROD. Significant or fundamental changes to the ROD for RKP are not anticipated.

3.0 RESPONSIVENESS SUMMARY

This Section of the ROD presents stakeholder comments regarding the Proposed Plan for the RKP site and provides a response to the comments considered in selection of the final remedy at RKP. Five written comments were received during the 30-day public comment period from May 6, 2002, to June 6, 2002, and two formal comments were received during the public meeting on May 16, 2002. The comments and the responses to the comments are presented below:

Comment #1: In accordance with U.S. EPA, Region 5's instructions during the public meeting of May 16, 2002, the West Chicago Park District, operator of Reed-Keppler Park, is submitting its comment on the "Proposed Plan for Final Cleanup Action at Reed-Keppler Park Site" dated April, 2002. The Park District has now had the opportunity to review and consider that Proposed Plan which calls for No Further Action with periodic ground water monitoring until MCL's are reached for total uranium. It is the Park District's understanding that if the total uranium concentrations in the ground water beneath the Park increase or fail to meet MCL's after an appropriate period of monitoring, U.S. EPA may consider supplemental action as to ground water. With that understanding, the Park District supports the adoption of the Proposed Plan.

Response #1: This Record of Decision does indeed include language that stipulates that additional active remediation of groundwater at the RKP site may be necessary if total uranium concentrations fail to decrease, or if they increase, in the future. Section 2.11 - Selected Remedy, states "In the unlikely event that total uranium concentrations in RKP groundwater fail to decrease, or if they continue to increase, in the future, more active remediation methods will be considered for the groundwater at RKP."

US EPA considers it unlikely that concentrations of uranium will remain above the MCL of 30 micrograms per liter (ug/L), or 27 picoCuries per liter (pCi/L) in RKP-5, or any of the other wells at RKP, for several reasons: (1) the source of the contamination has been removed from the RKP site soils; (2) Only one of the nine wells at the RKP site (RKP-5) exhibited groundwater contamination above the MCL drinking water standard. RKP-5 was also sampled in January 1998, and the concentration of uranium in the well at that time was 7.43 pCi/L, which is below the MCL. Because RKP-5 was in compliance with the MCL when it was sampled in 1998, and because of the fact that the result in August 2001 is only marginally above the MCL, there is a high probability that the 37.1 pCi/L result is an isolated sample result that will diminish within a reasonable time. In fact, beginning in December 1997, a total of 15 samples have been collected from the nine RKP groundwater wells, and the 37.1 pCi/L result from RKP-5 in August 2001 is the only exceedance of the MCL in the data set, and finally; (3) groundwater velocity estimates at the RKP site range from 20 to 1,300 feet per year, with an average of 200 feet per year. The distance from the areas at RKP where the highest contamination were found to RKP-5 is between 400 and 500 feet. Even if it assumed that the groundwater has been flowing at the slowest possible velocity (20 feet per year) since the waste material was placed at Reed-Keppler Park in the 1940's and 1950's, the contamination should have reached the RKP-5 location in 20 to 25 years (in the 1960's or 1970's). If this were true, groundwater samples collected at RKP-5 from

that time on would show radioactive contamination in the groundwater at the location of RKP-5. RKP-5 was not installed and sampled until January 1998, but if contamination from the RKP site had migrated to RKP-5 any earlier than 1998 (as it should have), then the contamination would still show up in the groundwater sampling results (which it did not). In fact, other site wells which are downgradient, and even closer to, the contamination source area, have never shown exceedances of the MCL, which would indicate that a contamination "plume" has never reached these wells. Groundwater sample results from RKP-5 and other RKP monitoring wells do not support the possibility that groundwater contamination has migrated from the contamination zones to offsite areas. Given that RKP-5 was in compliance with the MCL in 1998, it is likely that the exceedance seen in RKP-5 in 2001 is an isolated result, and not part of an overall site "plume". US EPA is requiring groundwater monitoring at RKP to verify the fact that the MCL exceedance was an isolated event, and that there is not a continuing source of contamination that has not been identified.

Comment #2: In accordance with U.S. EPA, Region 5's instructions during the public meeting of May 16, 2002, the City of West Chicago, owner of Reed-Keppler Park, is submitting its comment on the "Proposed Plan for Final Cleanup Action at Reed-Keppler Park Site" dated April, 2002. The City has now had the opportunity to review and consider that Proposed Plan which calls for No Further Action with periodic ground water monitoring until MCL's are reached for total uranium. It is the City's understanding that if the total uranium concentrations in the ground water beneath the Park increase or fail to meet MCL's after an appropriate period of monitoring, U.S. EPA may consider supplemental action as to ground water. With that understanding, the City supports the adoption of the Proposed Plan.

Response #2: This Record of Decision does indeed include language that stipulates that additional active remediation of groundwater at the RKP site may be necessary if total uranium concentrations fail to decrease, or if they increase, in the future. Section 2.11 - Selected Remedy, states "In the unlikely event that total uranium concentrations in RKP groundwater fail to decrease, or if they continue to increase, in the future, more active remediation methods will be considered for the groundwater at RKP."

US EPA considers it unlikely that concentrations of uranium will remain above the MCL of 30 micrograms per liter (ug/L), or 27 picoCuries per liter (pCi/L) in RKP-5, or any of the other wells at RKP, for several reasons: (1) the source of the contamination has been removed from the RKP site soils; (2) Only one of the nine wells at the RKP site (RKP-5) exhibited groundwater contamination above the MCL drinking water standard. RKP-5 was also sampled in January 1998, and the concentration of uranium in the well at that time was 7.43 pCi/L, which is below the MCL. Because RKP-5 was in compliance with the MCL when it was sampled in 1998, and because of the fact that the result in August 2001 is only marginally above the MCL, there is a high probability that the 37.1 pCi/L result is an isolated sample result that will diminish within a reasonable time. In fact, beginning in December 1997, a total of 15 samples have been collected from the nine RKP groundwater wells, and the 37.1 pCi/L result from RKP-5 in August 2001 is the only exceedance of the MCL in the data set, and finally; (3) groundwater velocity estimates at

the RKP site range from 20 to 1,300 feet per year, with an average of 200 feet per year. The distance from the areas at RKP where the highest contamination were found to RKP-5 is between 400 and 500 feet. Even if it assumed that the groundwater has been flowing at the slowest possible velocity (20 feet per year) since the waste material was placed at Reed-Keppler Park in the 1940's and 1950's, the contamination should have reached the RKP-5 location in 20 to 25 years (in the 1960's or 1970's). If this were true, groundwater samples collected at RKP-5 from that time on would show radioactive contamination in the groundwater at the location of RKP-5. RKP-5 was not installed and sampled until January 1998, but if contamination from the RKP site had migrated to RKP-5 any earlier than 1998 (as it should have), then the contamination would still show up in the groundwater sampling results (which it did not). In fact, other site wells which are downgradient, and even closer to, the contamination source area, have never shown exceedances of the MCL, which would indicate that a contamination "plume" has never reached these wells. Groundwater sample results from RKP-5 and other RKP monitoring wells do not support the possibility that groundwater contamination has migrated from the contamination zones to offsite areas. Given that RKP-5 was in compliance with the MCL in 1998, it is likely that the exceedance seen in RKP-5 in 2001 is an isolated result, and not part of an overall site "plume". US EPA is requiring groundwater monitoring at RKP to verify the fact that the MCL exceedance was an isolated event, and that there is not a continuing source of contamination that has not been identified.

Comment #3: No plan? My concern is that there are no action criteria for action whether uranium goes up or down. Seems to me if uranium goes above 50 pCi/L or goes up three period in a row, we blew and need to reevaluate. Maybe some boreholes upstream etc to see if much uranium around. Also if dips below 30 and stays for a while/you decide how long/, stop monitoring and pack up and go home. Believe these should be defined in advance so everybody knows the rules.

Suggest that results be released by EPA for publications as soon as available and any action announced. You cannot force publication but can do press release, put a notice in library, and post on City Hall bulletin board. This has been a citizen driven remediation and suggest agency go out of its way to make the information available.

Would still like to see background papers and plan when available. Thanks.

Response #3: Section 2.11 - Selected Remedy states that "The Selected Remedy is Alternative #2, No Further Action, along with monitoring to insure that future concentrations of uranium in the RKP site groundwater meet the MCL drinking water standard of 30 ug/L, or 27 pCi/L. *This monitoring will continue until it has been demonstrated that the MCLs have been achieved, and maintained, for three consecutive sampling events.*" US EPA is requiring compliance with the MCL for three consecutive sampling events to insure that uranium concentrations will not "rebound" after an acceptable concentration has been measured. Section 2.11 also states that "Sampling frequency may be increased, or decreased, based upon the results from future sampling events," and that "In the unlikely event that total uranium concentrations in RKP

groundwater fail to decrease, or if they continue to increase, in the future, more active remediation methods will be considered for the groundwater at RKP." The source of any potential contamination in groundwater has been removed from the RKP soils, therefore, there is every expectation that, with time, the uranium concentration in RKP groundwater will decrease. US EPA may elect to increase the sampling frequency if concentrations increase to determine whether the results are "seasonal" in nature, or whether they vary with groundwater elevation changes caused by heavy rain or drought. US EPA may also, as you have suggested, collect further soil samples to try to determine whether there is a source area that was missed during the removal action at RKP. In any event, before US EPA could take more active measures for groundwater at RKP, a revised Proposed Plan and ROD amendment, along with the appropriate 30-day public comment period, would be required, as described in Section 2.12 of this ROD.

Any reports or publications generated as a result of future groundwater monitoring will be available for public review in the Administrative Record for the RKP site and the local repository at the West Chicago Public Library. In addition, US EPA routinely makes these reports available to individuals when requested. US EPA will announce when these reports are available for public inspection. US EPA appreciates the community involvement associated with the RKP site, and continues to encourage the submittal of any comments or questions regarding the RKP site.

Comment #4: This is in regard to your news letter dated April 2002, "US EPA issues Proposed Plan for Final Cleanup at Reed-Keppler Park site". My family and I live in unincorporated West Chicago and request EPA inspection of our well water. This seems only fair! If City water users have this inspection/monitoring, why not monitoring on wells? We pay taxes! Since when is cost a reason for this discrimination against home owners with wells? The gas and electric company read our meters. Why not the EPA getting samples from our sill corks and checking for uranium contamination? When a residence is sold the DuPage County Health Department checks water, but not for uranium contamination. Please protect all of the people under your jurisdiction, not just some of the people!

Response #4: As you mentioned, the City of West Chicago does perform testing on City drinking water for certain potential contaminants, as required by the Safe Drinking Water Act. The concentrations of uranium and/or radium seen in drinking water in the City of West Chicago are a result of background conditions in the aquifer (not from the Kerr-McGee sites) from which the City draws its drinking water, and they do not represent an unacceptable health risk to residents of the City. US EPA typically only performs testing of private wells as part of ongoing remedial efforts, and not on a routine basis, as routine testing of residential drinking water is usually performed on a local government level or by property owners themselves. In the past, the Illinois Department of Nuclear Safety (IDNS) has performed testing on private wells in unincorporated West Chicago at the request of the property owner, at no cost to the owner. US EPA has verified that this program still exists, and that IDNS would be willing to test your private well at your request. To request that your well be sampled by IDNS, please contact:

Tim Runyon
Illinois Department of Nuclear Safety
1301 Knotts Street
Springfield, IL 62703
(217) 786-6365

IDNS will collect a sample of the water from your well and provide results to you.

Comment #5: I don't believe there should be any question as to which one to choose. Alternative #2 offers some sort of limited safeguard to the community. It is certainly better than none. I also feel the City or powers to be consider the probability of securing Lake Michigan water - as a back-up source of water.

Ultimately - I, like the rest of my fellow neighbors and citizens, would like to believe that our government and the agencies funded by our taxes - will continue the process begun and work to protect us and our generations of children to come, from the invisible toxins once buried in our community.

Response #5: US EPA understands that you support the Selected Remedy and appreciates your comment.

Comment #6: (From the public meeting of May 16, 2002) - I want to say I want to thank everybody here for all the work they have done on this, and this has been a great effort to get our park to this point. But having said that, the second alternative, I think it goes without saying, that it is in the best interest of the people of West Chicago, my neighbors, and constituents.

Response #6: US EPA understands that you support the Selected Remedy and appreciates your comment.

Comment #7: (From the public meeting of May 16, 2002) - If there is no monitoring between the source and the well and you cut off your monitoring before that contamination has a chance to travel to that well, you could be missing a potential problem. It would seem to be in the interest of protecting the environment to – before you reach a cutoff date, to figure out the groundwater rate and how far it is from the well and then you would do your three consecutive tests because I understand and support and realize what level the cleanup was at the park.... But if there is something in the groundwater that is already contaminated and you cut it off before it would reach a monitoring well, you could be missing an opportunity. I also support the monitoring compared to no monitoring....

Response #7: The *Remedial Investigation Report for the Kerr-McGee Reed-Keppler Park Site*, dated March 21, 2002, states that "Groundwater pore velocity estimates ranged between 20 feet per year and 1,300 feet per year, with an average probable velocity of 200 feet per year." This velocity is in a south south-easterly direction from the contamination areas to the area of

monitoring wells RKP-2, RKP-3, RKP-4, and RKP-5 and MW-7, MW-8 and MW-9. The only well that has shown an exceedance of the MCL for uranium is RKP-5, which is located about 400 feet east of the former enclosure area, where high contamination levels were observed in RKP soil. Even if it assumed that the groundwater has been flowing at the slowest possible velocity (20 feet per year) since the waste material was placed at Reed-Keppler Park in the 1940's and 1950's, the contamination should have reached the RKP-5 location in 20 to 25 years (in the 1960's or 1970's). If this were true, groundwater samples collected at RKP-5 from that time on would show radioactive contamination in the groundwater at the location of RKP-5. RKP-5 was not installed and sampled until January 1998, but if contamination from the RKP site had migrated to RKP-5 any earlier than 1998 (as it should have), then the contamination would still show up in the groundwater sampling results (which it did not). It should be noted that monitoring wells MW-7, MW-8 and MW-9 are located in the *immediate* vicinity (within 100 feet) of the area where the highest soil contaminant concentrations were located, and these wells do not contain uranium in exceedance of the MCL. Given that RKP-5 was in compliance with the MCL in 1998, it is likely that the exceedance seen in RKP-5 in 2001 is an isolated result, and not part of an overall site "plume". US EPA is requiring groundwater monitoring at RKP to verify the fact that the MCL exceedance was an isolated event, and that there is not a continuing source of contamination that has not been identified. US EPA also understands that you support the Selected Remedy and appreciates your comment.

Appendix A

Letter of Concurrence from Illinois EPA

STATUTORY DETERMINATIONS

The removal action performed in accordance with the UAO and the ROD meets all the nine threshold criteria established by the NCP and CERCLA. U.S.EPA, with the assistance of Illinois EPA, will evaluate any new information identified to ensure that the selected remedy remains protective. Significant changes will be evaluated pursuant to Section 117 of CERCLA and 40 CFR 300.435(c)(2)(I). Any change to the ROD necessitated by new information will be conducted through an Explanation of Significant Differences ("ESD") or a ROD Amendment.

Renee Cipriano
Director
Illinois Environnemental Protection Agency

9/11/02
Date

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Kerr-McGee Reed-Kepler Park National Priorities List Site
West Chicago, Illinois

STATEMENT OF BASIS AND PURPOSE

This decision document represents concurrence by the State of Illinois on the selected Final Remedial Action for the Kerr-McGee Reed-Kepler Park National Priorities List Site ("Site") in West Chicago, Illinois. This action was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended ("CERCLA" or "Superfund") and to the extent practicable, with the National Oil and Hazardous Substances Contingency Plan ("NCP", 40 Code of Federal Regulations ("CFR") 300). The decisions contained herein are based on information contained in the administrative record for this site.

ASSESSMENT OF THE SITE

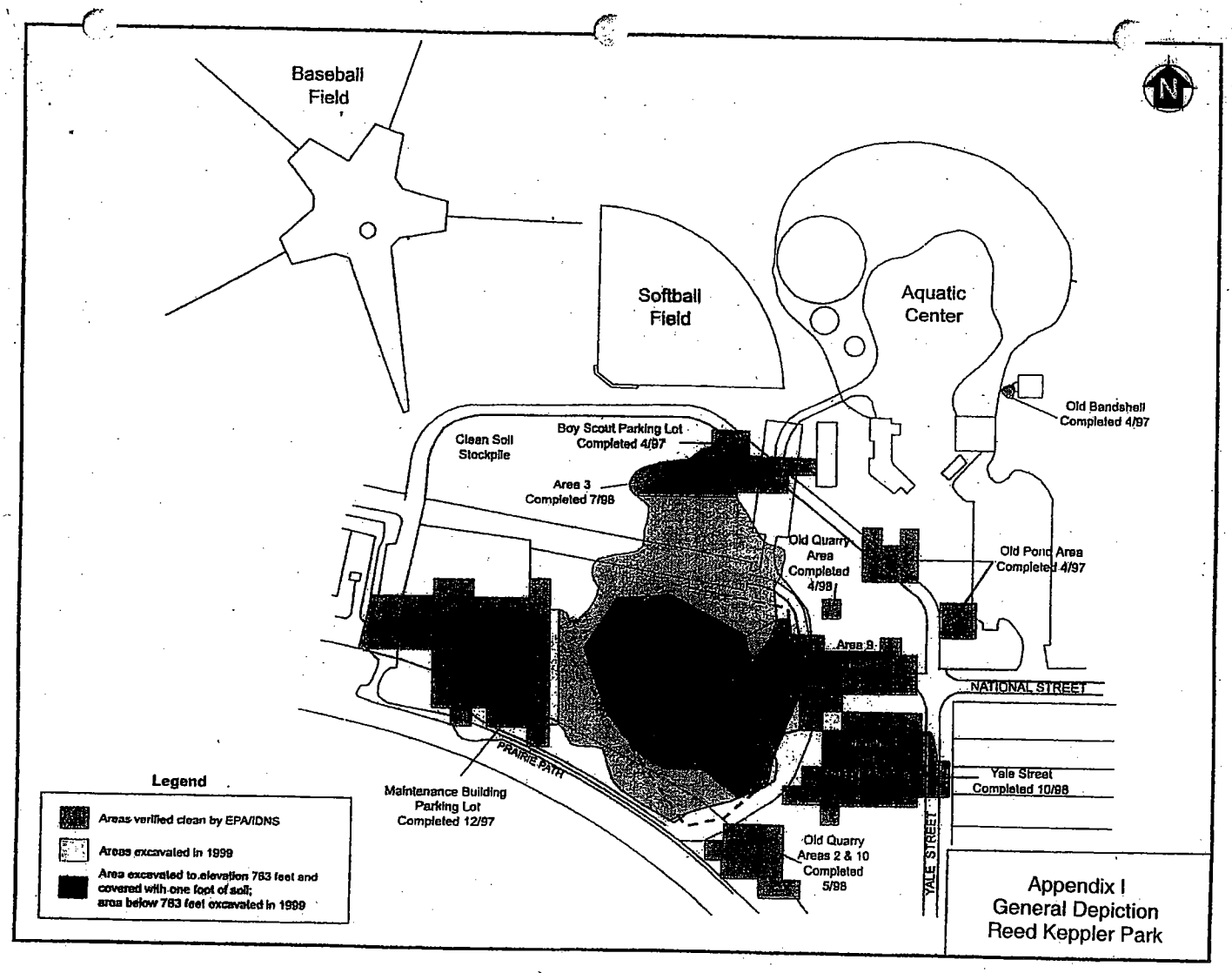
Actual or threatened releases of hazardous substances from the Site were addressed by a time critical removal action required by a United States Environmental Protection Agency ("U.S.EPA") Unilateral Administrative Order ("UAO"). The time critical removal action removed 114,652 cubic yards of contaminated soil between April 1997 and October 1999 to a radiological cleanup level of 7.2 picocuries per gram (pCi/g). Excavated areas were then backfilled with a minimum of three feet of clean fill.

DESCRIPTION OF THE REMEDY

The response action selected in this Record of Decision ("ROD") is No Further Action with groundwater monitoring. The groundwater monitoring portion of the selected remedy is to insure that concentrations of uranium in groundwater meet the maximum contaminant level ("MCL") drinking water standard for uranium of 30 micrograms per liter (ug/l). Groundwater monitoring will continue until it has been demonstrated that the MCLs have been achieved and maintained for three consecutive sampling events. Selection of this remedy was based upon groundwater sampling results that revealed one well with a concentration of 33 ug/l for uranium. Sampling will initially be performed twice a year and will be reassessed annually, depending upon the results. The frequency of sampling may have to be reevaluated if the groundwater standard continues to be exceeded.

APPENDIX I

GENERAL DEPICTION OF THE RKP SITE


Baseball Field
Softball Field
Aquatic Center
N
Old Bandshell Completed 4/97
Clean Soil Stockpile
Boy Scout Parking Lot Completed 4/97
Area 3 Completed 7/98
Old Quarry Area Completed 4/98
Old Pond Area Completed 4/97
Area 9
NATIONAL STREET
PRAIRIE PATH
Maintenance Building Parking Lot Completed 12/97
Yale Street Completed 10/98
Old Quarry Areas 2 & 10 Completed 5/98
YALE STREET
Legend
Areas verified clean by EPA/IDNS
Areas excavated in 1999
Area excavated to elevation 783 feet and covered with one foot of soil; area below 783 feet excavated in 1999
Appendix I
General Depiction
Reed Keppler Park

Consent Decree in the matter of United States and Illinois v. Kerr-McGee Chemical LLC, relating to the Kerr-McGee West Chicago NPL Sites.

APPENDIX J

RKP UNILATERAL ADMINISTRATIVE ORDER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region V

IN THE MATTER OF:	)	Docket No.
	)	
Kerr-McGee Reed Keppler Park Removal Site	)	
	)	V-W-96-C-364
	)	
Kerr-McGee Chemical Corporation, City of West Chicago,	)	
	)	
Respondents.	)	
	)	
Proceeding Under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (42 U.S.C. § 9606(a))	)	

UNILATERAL ADMINISTRATIVE ORDER

TABLE OF CONTENTS

I. INTRODUCTION AND JURISDICTION

1. This Order directs Respondents to perform the removal actions described herein to abate an imminent and substantial endangerment to the public health, welfare or the environment that may be presented by the actual or threatened release of hazardous substances at or from the Site. This Order is issued to Respondents by the United States Environmental Protection Agency ("U.S. EPA") under the authority vested in the President of the United States by § 106(a) of CERCLA. This authority was delegated to the Administrator of U.S. EPA on January 23, 1987, by Executive Order 12580 (52 Fed. Reg. 2,926), and was further delegated to the Regional Administrator on September 13, 1987 by U.S. EPA Delegation No. 14-14-A and 14-14-B, and to the Director, Superfund Division, Region V, by Regional Delegation Nos. 14-14-A and 14-14-B (May 2, 1996).

II. PARTIES BOUND

2. This Order shall apply to and be binding upon Respondents and their successors and assigns. Respondents are responsible for carrying out all actions required by this Order. No change in the ownership, corporate status, or other control of Respondents shall alter any of Respondents' responsibilities under this Order.

3. Respondents shall provide a copy of this Order to any prospective owners or successors before a controlling interest in Respondents' assets, property rights, or stock are transferred to the prospective owner or successor. Respondents shall provide a copy of this Order to each contractor, subcontractor, laboratory, or consultant retained to perform any Work under this Order, within five days after the effective date of this Order or on the date such services are retained, whichever is later. Respondents shall also provide a copy of this Order to any person acting on behalf of Respondents with respect to the Site or the Work and shall ensure that all contracts and subcontracts entered into hereunder require performance under the contract to be in conformity with the terms and Work required by this Order. With regard to the actions undertaken pursuant to this Order, each contractor and subcontractor shall be deemed to be related by contract to Respondents within the meaning of § 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3). Notwithstanding the terms of any contract, Respondents are responsible for compliance with this Order and for ensuring that its contractors, subcontractors and agents perform all Work in accordance with this Order.

4. Not later than thirty (30) days prior to any transfer of any interest of Respondents in any real property included within the Site, Respondents shall submit a true and correct copy of the transfer documents to U.S. EPA, and shall identify the

transferee(s) by name, principal business address and effective date of the transfer.

III. DEFINITIONS

5. Unless otherwise expressly provided herein, terms used in this Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in the statute or its implementing regulations. Whenever terms listed below are used in this Order or in the documents attached to this Order or are incorporated by reference into this Order, the following definitions shall apply:

a. "Action Criteria Document" shall mean the November 1993 U.S. EPA document entitled "Action Criteria for Superfund Removal Actions at the Kerr-McGee Residential Areas Site, West Chicago, Illinois" which is attached hereto as Attachment 3. The Action Criteria Document is incorporated into this Order and is an enforceable part of this Order.

b. "Action Memorandum" shall mean the U.S. EPA Action Memorandum relating to the Site signed in March 1996 by the Remedial Project Manager/On-Scene Coordinator and the Regional Administrator, U.S. EPA, Region V, and all attachments thereto, which is attached as Attachment 2. The Action Memo is incorporated into this Order and is an enforceable part of this Order.

c. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601 to 9675.

d. "City" shall mean the City of West Chicago, DuPage County, Illinois.

e. "Day" shall mean a calendar day unless expressly stated to be a working day. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the end of the next working day.

f. "DOT" shall mean the United States Department of Transportation.

g. "EE/CA" shall mean the August 1994 Engineering Evaluation and Cost Analysis for the Residential Areas Site conducted by U.S. EPA pursuant to Section 300.415(b)(4)(I) of the NCP.

h. "IEPA" shall mean the Illinois Environmental Protection Agency.

I. "IDNS" shall mean the Illinois Department of Nuclear Safety.

j. "Kress Creek NPL Site" shall mean the Kerr-McGee Kress Creek/West Branch of DuPage River Site placed on the NPL in February 1991.

k. "Lindsay Light" shall mean the Lindsay Light and Chemical Company.

l. "National Contingency Plan" or "NCP" shall mean the National Contingency Plan promulgated pursuant to § 105 of CERCLA, 42 U.S.C. § 9605, and codified at 40 C.F.R. Part 300, and any amendments thereto.

m. "NPL" means the "National Priorities List" as defined in Section 300.5 of the NCP.

n. "NRC" means the United States Nuclear Regulatory Commission.

o. "Paragraph" shall mean a portion of this Order identified by an Arabic numeral.

p. "Performance Standards" shall mean those cleanup standards, standards of control, and other substantive requirements, criteria or limitations, identified in the Action Criteria Document, Action Memorandum and Statement of Work, that the Work required by this Order must attain and maintain.

q. "REF" shall mean the Kerr-McGee Rare Earths Facility, 800 Weyrauch Street, West Chicago, Illinois.

r. "Residential Areas NPL Site" shall mean the Kerr-McGee Residential Areas Site placed on the NPL in August 1990.

s. "Reed Keppler Park Site" or "RKP Site" shall mean all properties within the Reed Keppler Park NPL Site at which U.S. EPA determines that Respondents shall perform Work, including, but not limited to, the tennis courts, the area which previously operated as a landfill, and the area that currently contains the Family Aquatic Center.

t. "Respondents" shall mean the Kerr-McGee Chemical Corporation and the City of West Chicago.

u. "Response Costs" shall mean all costs, including direct costs, indirect costs, and interest incurred by the United States to perform or support response actions at the Site, including, but not limited to, contract and enforcement costs.

v. "RPM/OSC" shall mean U.S. EPA's Remedial Project Manager/On-Scene Coordinator.

w. "Section" shall mean a portion of this Order identified by a Roman numeral and includes one or more paragraphs.

x. "Section 106 Administrative Record" shall mean the Administrative Record which includes all documents considered or relied upon by U.S. EPA in preparation of this Order. The Section 106 Administrative Record Index is a listing of all documents included in the Section 106 Administrative Record, and is appended hereto as Appendix 1.

y. "State" shall mean the State of Illinois.

z. "Statement of Work" or "SOW" shall mean the statement of work for implementation of the removal actions at the Site, which is attached hereto as Attachment 1. The Statement of Work is incorporated into this Order and is an enforceable part of this Order.

aa. "Work" shall mean all actions Respondents are required to perform under this Order and all attachments hereto, including, but not limited to removal actions.

IV. FINDINGS OF FACT

Based on available information, including the Section 106 Administrative Record in this matter, U.S. EPA hereby finds that:

6. The REF was established in 1932 by Lindsay Light to extract thorium and rare earth compounds from ore, a process which produced mill tailings classified as "11(e)(2) byproduct material" pursuant to 42 U.S.C. § 2014(e)(2). NRC records indicate that, during the 1930's and 1940's, Lindsay Light transported mill tailings from the REF for disposal at the areas now known as the Kerr-McGee Reed-Keppler Park and West Chicago Sewage Treatment Plant NPL Sites and that, in the process of such transport, mill tailings came to be located at the Site.

7. In March of 1933, the City of West Chicago purchased the Reed Keppler Park Site, and it still owns the Site. The City of West Chicago operated the Site as an open landfill/dump from the 1930's through the 1960's. The city is currently leasing portions of the Site to the Park District.

8. The Lindsay Light and Chemical Company merged into the American Potash & Chemical Company in 1958; the American Potash & Chemical Company merged into Respondent, Kerr McGee Chemical Corporation, in 1967.

9. The REF ceased operations in 1973 and is undergoing closure proceedings through the IDNS.

10. The REF mill tailings located at the Site contain radionuclides, which radioactively decay, emitting ionizing radiation such as alpha particles, beta particles and gamma radiation. Exposure to ionizing radiation, if at sufficiently high doses and dose rates, can cause carcinogenic, genetic and teratogenic effects. The mill tailings also contain heavy metals, including lead, barium and chromium. Effects of chronic exposure to low levels of lead range from anemia to impairment of the nervous, hematopoietic and cardiovascular systems. The effects of exposure to barium can include paralysis, cardiovascular abnormalities and gastroenteritis. Chronic ingestion of hexavalent chromium can cause kidney damage, while chronic inhalation can cause lung cancer.

11. During 1976, the RKP Site was briefly closed to allow a radiological survey of the area, and material was excavated from near the tennis courts and deposited in the primary waste area of the landfill. A security fence was installed around the primary waste area in early 1977. The purpose of the fence was to limit access to areas creating exposures above one-tenth of the NRC unrestricted access criterion of 2.0 mrad/hr.

12. Based on results of investigations done on behalf of the NRC and the U.S. EPA, and taking into account such factors as populations at risk, the potential of hazardous substances being present, the potential for contamination of drinking water supplies and the destruction of sensitive ecosystems, the Reed Keppler Park NPL Site was placed on the NPL in August 1990.

13. In 1982, Radiation Management Corporation completed a radiological survey for the NRC. This survey found radiological contamination predominantly inside the fence. Two areas identified by this survey outside the fenced area included a strip directly north of the security fence and a small deposit at the southern end of the tennis courts.

14. In November 1993, U.S. EPA established criteria for the identification and cleanup of radionuclides at the Residential Areas NPL Site. The U.S. EPA criteria contained in the Action Criteria Document are more stringent than the 30 μR/hr criterion used in the 1984 and 1985 cleanups conducted by Kerr-McGee. The U.S. EPA currently believes that the presence of any lead, barium and chromium at the Site is due to the presence of the mill tailings and that excavation of the mill tailings to the cleanup standards for radionuclides contained in the Action Criteria Document will adequately mitigate any risk presented by these metals. If during this removal U.S. EPA determines that response

action beyond that required under the current terms of this Order is necessary to mitigate any risk presented by the metals, U.S. EPA will follow the procedures in Section IX (Additional Work).

15. In 1991, a limited site investigation for the West Chicago Park District was conducted by Versar Inc. in an area north and east of the waste area where the Family Aquatic Center swimming pool had been proposed. As a result of that work, additional surface radiological contamination and buried waste material were found at four additional areas: a strip directly west of the old swimming pool, an area further west from the old pool location at the site of a former pond, an area near an old bandstand, and an area at the west end of National Street. An additional area under the sidewalk of the old pool was identified during the construction of the Family Aquatic Center.

16. In the early spring of 1993, CH2M Hill initiated fieldwork for a Remedial Investigation ("RI") under contract to EPA. The RI study included radiological walkover surveys of all known and suspected contaminated areas, surface soil, soil boring, vegetation, and groundwater samples.

17. Most of the radiological contamination in the landfilled quarry is located within the fenced security area, although some contamination extends approximately 20 feet west of the fenced

area. Measured surface radiation exposure rates within the fence have been as high as 1,600 uR/hr. Based on subsurface radiological data, the contamination is in a layer ranging in thickness from approximately 3 to 8 ft, and occurring at depths up to 14 ft below land surface.

18. In March 1996, U.S. EPA issued the Action Memorandum for the Site, pursuant to OSWER Directive 9360.3-01, selecting the removal actions described in paragraph 26.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above, and the Section 106 Administrative Record, U.S. EPA has determined that:

19. The Site is a "facility" as defined by Section 101(9) of CERCLA.

20. Radionuclides, lead, chromium and barium are "hazardous substances" as defined by Section 101(14) of CERCLA.

21. Respondents are "persons" as defined by Section 101(21) of CERCLA.

22. Respondents are persons who may be liable under Section 107(a) of CERCLA and, therefore, are subject to an administrative order under Section 106(a) of CERCLA.

23. The conditions described in the Findings of Fact above and the Action Memorandum constitute an actual or threatened "release" of a hazardous substance from the facility into the "environment" as defined by Sections 101(8) and (22) of CERCLA.

24. The conditions present at the Site constitute a threat to public health, welfare, or the environment based upon the factors set forth in Section 300.415(b)(2) of the NCP. These factors include, but are not limited to, the following:

a. actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants or contaminants; this factor is present at the Site due to the existence of mill tailings in the soils, including areas which are or may be used for recreation.

b. high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate; this factor is present at the Site due to the existence of mill tailings in surface and near subsurface

soils in concentrations of up to 15,000 pCi/g of total radium that may migrate due to wind, erosion, deliberate human movement, or potential generation of radon/thoron gas from highly contaminated soils at or near the surface.

c. weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released; this factor is present at the Site due to the existence of mill tailings in surface and near subsurface soils that may migrate due to wind or erosion.

25. The actual or threatened release of hazardous substances from the Site may present an imminent and substantial endangerment to the public health, welfare, or the environment within the meaning of Section 106(a) of CERCLA.

26. Based on the conditions at the Site and the actual or threatened release of hazardous substances from the Site, U.S. EPA determined in the Action Memorandum that the following removal actions are necessary (more details on the selected removal actions are contained in Section VII of this Order, in the Action Memorandum and the Scope of Work):

a. Soil sampling to further delineate areas above the cleanup criterion of 5 pCi/g total radium (Ra-226 plus Ra-

228) above background or 7.2 pCi/g total radium (background conditions are 2.2 pCi/g total radium).

b. Excavate radioactive contaminated materials from the RKP Site (including the fenced area and other areas identified throughout the park) found to exceed EPA's discovery and characterization criteria as defined for the Residential Areas Site until levels at or below the verification criteria are reached, including implementing the ALARA principle (see action criteria document).

c. Provide additional measures (e.g., institutional controls) for those limited and exceptional situations that may occur where complete excavation of contaminated materials cannot be reasonably accomplished and such measures are needed to reduce exposures and associated risks.

d. Minimize the potential health hazards to workers performing the removal action and to nearby residents during the removal action.

e. Consolidate landfill wastes left behind, as appropriate, and provide an adequate RCRA Subtitle D landfill cover over this material.

f. Backfill the excavated areas with clean soil and appropriately restore the excavated areas for recreational uses, or to such other condition as may be arranged with the

property owner, and restore as required to comply with RCRA Subtitle D closure requirements.

g. Use appropriate environmental monitoring during and after removal to verify that cleanup levels are reached and short-term impacts (e.g. generation of dust during removal) are minimized.

h. After excavation, transport excavated contaminated materials removed from the RKP Site to an off-site disposal facility licensed to accept and dispose of 11(e)(2) byproduct material.

27. The removal actions selected in the Action Memorandum directly address actual or threatened releases of hazardous substances at the Site. Excavation and off-Site disposal of the hazardous substances permanently segregates the contaminated soils from the public and effectively reduces exposure to nearby populations. For certain limited situations where complete excavation of contaminated soils cannot be accomplished, providing additional measures as necessary also reduces exposure to nearby populations.

28. The removal actions required by this Order are necessary to protect the public health, welfare, or the environment, and are not inconsistent with the NCP or CERCLA.

VI. NOTICE TO THE STATE

29. U.S. EPA has notified the IEPA and IDNS that U.S. EPA intends to issue this Order. As U.S. EPA deems appropriate, U.S. EPA will consult with the IEPA and IDNS, and the IEPA and IDNS will have the opportunity to review and provide comments to U.S. EPA regarding all Work to be performed, including reports, technical data and other deliverables, and any other issues which arise while the Order remains in effect. The IDNS will conduct verification activities at the Site during and after the removal actions are conducted, as described in the SOW.

VII. ORDER

30. Based on the foregoing, Respondents are hereby ordered to comply with all of the provisions of this Order, including but not limited to all attachments to this Order, all documents incorporated by reference into this Order, and all schedules and deadlines contained in this Order, attached to this Order, or incorporated by reference into this Order.

VIII. WORK TO BE PERFORMED

31. Within five (5) days after receiving notification from U.S. EPA pursuant to Paragraph II.A. of the SOW that any parcel of property owned by Respondents requires excavation and restoration Work, Respondents shall record notice of and/or a copy of this Order in the appropriate governmental office where

land ownership and transfer records are filed or recorded, and shall ensure that the recording of said notice and/or Order is indexed to the title of each and every parcel of property owned by Respondents at the Site, so as to provide notice to third parties of the issuance and terms of this Order with respect to those properties. Respondents shall, within ten (10) days after such recording and indexing, send notice of such recording and indexing to U.S. EPA.

32. All work plans, reports, engineering design documents, and other deliverables (work plans and deliverables), as described throughout this Order, will be reviewed and either approved, approved with modifications, or disapproved by U.S. EPA. In the event of approval or approval with modifications by U.S. EPA, Respondents shall proceed to take any action required by the work plan, report, or other item, as approved or modified by U.S. EPA. If the work plan or other deliverable is approved with modifications or disapproved, U.S. EPA will provide, in writing, comments or modifications required for approval. Respondents shall amend the work plan or other deliverable to incorporate only those comments or modifications required by U.S. EPA. Within ten (10) days of the date of U.S. EPA's written notification of approval with modifications or disapproval, Respondents shall submit an amended work plan or other deliverable, except that Respondents shall submit any amended

monthly schedule required in Paragraph II.2. of the SOW within five (5) days of the date of such notification. U.S. EPA shall review the amended work plan or deliverable and either approve or disapprove it. Failure to submit a work plan, amended work plan or other deliverable within the specified time frame shall constitute noncompliance with this Order. Submission of an amended work plan or other deliverable which fails to incorporate all of U.S. EPA's required modifications, or which includes other unrequested modifications, shall also constitute noncompliance with this Order. Approval by U.S. EPA of the (amended) work plan or other deliverable shall cause said approved (amended) work plan or other deliverable to be incorporated herein as an enforceable part of this Order. If any (amended) work plan or other deliverable is not approved by U.S. EPA, Respondents shall be deemed to be in violation of this Order.

33. In the event of an inconsistency between this Order and any subsequent approved (amended) work plan or other deliverable, the terms of this Order shall control.

34. The Work performed by Respondents pursuant to this Order shall, at a minimum, achieve the performance standards specified in the Action Criteria Document, the Action Memorandum and the Statement of Work. Nothing in this Order, or in U.S. EPA's approval of any (amended) work plan or other deliverable, shall

be deemed to constitute a warranty or representation of any kind by U.S. EPA that full performance of the removal actions required by this Order will achieve the performance standards set forth in the Action Criteria Document, the Action Memorandum and the SOW. Respondents' compliance with such approved documents does not foreclose U.S. EPA from seeking additional Work.

35. All materials removed from the Site shall be disposed of at a facility approved in advance of removal by U.S. EPA's RPM/OSC and in accordance with: 1) § 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3); 2) the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. §§ 6901 to 6992k, as amended; 3) the Procedures for Planning and Implementing Off-Site Response Actions, 58 Fed. Reg. 49,200 (September 22, 1993); and 4) all other applicable federal, State, and local requirements. Respondents shall provide written notice to the RPM/OSC which shall include all relevant information regarding the receiving facility, including the information required by Paragraph 36, before the hazardous substances are actually shipped off-Site.

36. Prior to any off-Site shipment of hazardous substances from the Site to an out-of-state waste management facility, Respondents shall provide written notification to the appropriate state environmental official in the receiving state and to U.S. EPA's RPM/OSC of such shipment of hazardous substances. However,

the notification of shipments to the state shall not apply to any off-Site shipments when the total volume of all shipments from the Site to the state will not exceed ten (10) cubic yards. The notification shall be in writing, and shall include the following information, where available: (1) the name and location of the facility to which the hazardous substances are to be shipped; (2) the type and quantity of the hazardous substances to be shipped; (3) the expected schedule for the shipment of the hazardous substances; and (4) the method of transportation. Respondents shall notify the receiving state of major changes in the shipment plan, such as a decision to ship the hazardous substances to another facility within the same state, or to a facility in another state.

37. Respondents shall cooperate with U.S. EPA in providing to the public information regarding the Work. When requested by U.S. EPA, Respondents shall participate in the preparation of such information for distribution to the public and in public meetings which may be held or sponsored by U.S. EPA to explain activities at or relating to the Site.

38. Respondents shall fulfill the requirements specified in the SOW and perform, at a minimum, the following removal actions which are further defined by the Action Memorandum and the attached Statement of Work ("SOW"):

a. characterize and delineate all areas of the RKP Site which exceed the discovery and characterization criteria contained in the Action Criteria Document and identify all necessary information needed to determine appropriate methods of excavation and waste handling;

b. excavate contaminated materials from areas at the Site found to exceed the discovery and characterization criteria contained in the Action Criteria Document until levels at or below the verification criteria contained in the Action Criteria Document are reached, including following the "As Low As Reasonably Achievable" principle;

c. provide additional measures for those limited and exceptional situations that may occur where complete excavation of contaminated soils cannot be accomplished and such measures are needed to reduce exposure and associated risks;

d. minimize the potential health hazards to workers performing the removal action and to nearby residents or users of the park during the removal action;

e. backfill the excavations with clean soil and restore affected areas to their original condition, or to such other condition as may be arranged with the property owner, and restore areas with landfilled wastes left in place to comply with RCRA Subtitle D requirements;

f. use appropriate environmental monitoring during and after removal to verify that cleanup levels are reached and short-term impacts are minimized; and

g. after excavation, transport all contaminated soils away from affected areas and ship all contaminated materials removed from affected areas to a licensed permanent disposal facility. All transportation of contaminated materials shall comply with appropriate NRC, DOT, and IDNS regulations.

39. Within 14 days of the effective date of this Order, Respondents shall submit to U.S. EPA a work plan for the Characterization and Delineation Phase of the removal actions at the Site described in Paragraph I.A. of the SOW ("Characterization and Delineation Work Plan"). Respondents shall develop the Work Plan in conformance with the SOW, the Action Criteria Document, the Action Memorandum, CERCLA and the National Contingency Plan. The Work Plan shall be subject to review, modification, and approval by U.S. EPA. Within fourteen (14) days after the effective date of this Order, the Respondents shall also submit the draft Health and Safety, Sampling and Quality Assurance Project Plans which, at a minimum, cover planned activities in the Characterization and Delineation Work Plan, as specified by the SOW. The work plan shall provide a

CERCLA and the requirements of this Order, including the standards, specifications and schedule contained in the approved work plans.

42. Within 60 days after completion of all on-Site Work required under this Order, Respondents shall submit for U.S. EPA review a final report summarizing the actions taken to comply with this Order. The final report shall conform to the requirements set forth in Section 300.165 of the NCP. The final report shall also include a good faith estimate of total costs incurred in complying with the Order, a listing of quantities and types of materials removed off-Site or handled on-Site, a listing of the ultimate destinations of those materials, a presentation of the analytical results of all sampling and analyses performed by or on behalf of Respondents, and accompanying appendices containing all relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits).

43. The final report shall also include a statement that the on-Site Work has been completed in full satisfaction of the requirements of this Order as well as the following certification of completion signed by a responsible official of Respondents or Respondents' Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant

penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

If U.S. EPA concludes, following the initial or any subsequent certification of completion by Respondents that the Work has been fully performed in accordance with this Order, U.S. EPA may notify Respondents that the Work has been fully performed. U.S. EPA's notification shall be based on present knowledge and Respondent's certification to U.S. EPA, and shall not limit U.S. EPA's right to perform periodic reviews pursuant to § 121(c) of CERCLA, 42 U.S.C. § 9621(c), or to take or require any action that in the judgment of U.S. EPA is appropriate at the Site, in accordance with 42 U.S.C. §§ 9604, 9606, or 9607.

IX. ADDITIONAL WORK

44. In the event that U.S. EPA determines that additional Work or modifications to Work are necessary to meet performance standards, to maintain consistency with this Order or to otherwise protect human health or the environment, U.S. EPA will notify Respondents that additional Work is necessary. U.S. EPA may also require Respondents to modify any plan, design, or other deliverable required by this Order, including any approved modifications.

45. Within twenty-one (21) days of receipt of notice from U.S. EPA that additional Work is necessary, Respondents shall submit

for approval an Additional Work Plan pursuant to Paragraph 44 herein. The Additional Work Plan shall conform to this Order's requirements for the Work Plan. Upon U.S. EPA's approval of the (amended) Additional Work Plan, the (amended) Additional Work Plan shall become an enforceable part of this Order, and Respondents shall implement the (amended) Additional Work Plan for additional Work in accordance with the standards, specifications, and schedule contained therein. Failure to submit an Additional Work Plan within the specified time frame shall constitute noncompliance with this Order.

X. ENDANGERMENT AND EMERGENCY RESPONSE

46. If any event during the performance of the Work causes or threatens to cause a release of a hazardous substance or may present an immediate threat to public health or welfare or the environment, Respondents shall immediately take all appropriate action to prevent, abate, or minimize the threat, and shall immediately notify U.S. EPA's RPM/CSC or alternate RPM/OSC. If neither of these persons is available, Respondents shall notify the U.S. EPA Emergency Response Unit, Region V at 312/353-2318. Respondents shall take further action in consultation with U.S. EPA's RPM/OSC and in accordance with all applicable provisions of this Order, including but not limited to the health and safety plan and the contingency plan. In the event that Respondents fail to take appropriate response action as required by this

such Work to the overall project schedule for removal action completion; and (4) describe all problems encountered and any anticipated problems, any actual or anticipated delays, and solutions developed and implemented to address any actual or anticipated problems or delays.

XII. QUALITY ASSURANCE, SAMPLING AND DATA ANALYSIS

49. Respondents shall use the quality assurance, quality control, and chain of custody procedures described in the "U.S. EPA NEIC Policies and Procedures Manual," May 1978, revised May 1986, U.S. EPA-330/9-78-001-R; U.S. EPA's "Guidelines and Specifications for Preparing Quality Assurance Program Documentation," June 1, 1987; U.S. EPA's "Data Quality Objective Guidance," (U.S. EPA/540/G87/003 and 004), and any amendments to these documents, while conducting all sample collection and analysis activities related to air monitoring and sampling of backfill material. To provide quality assurance and maintain quality control, Respondents shall:

a. Prior to the commencement of any sampling and analysis related to air monitoring, sampling of backfill material, or sampling required in the characterization phase of the removal, submit a Quality Assurance Project Plan (QAPP) to the U.S. EPA that is consistent with Task 3 of the SOW, (amended) work plans, U.S. EPA's "Interim Guidelines and Specifications For Preparing

Quality Assurance Project Plans" (QAM-005/80), the U.S. EPA Region V Model QAPP, and any subsequent amendments.

b. Prior to the development and submittal of the QAPP, attend a pre-QAPP meeting sponsored by U.S. EPA to identify all monitoring and data quality objectives. U.S. EPA, after review of the submitted QAPP, will either approve, conditionally approve, or disapprove the QAPP. Upon notification of conditional approval or disapproval, Respondents shall make all required modifications to the QAPP within fourteen (10) days of receipt of such notification.

c. Use only laboratories which have a documented Quality Assurance Program that complies with U.S. EPA guidance document QAMS-005/80 and subsequent amendments.

d. Ensure that the laboratory used by Respondents for analyses performs according to a method or methods in the approved QAPP.

e. Ensure that U.S. EPA personnel and U.S. EPA's authorized representatives are allowed access to the laboratory and personnel utilized by Respondents for analyses.

50. Respondents shall notify U.S. EPA in advance of any sample collection activity related to air monitoring, sampling of backfill material, or sampling required during the characterization phase. At the request of U.S. EPA, Respondents shall allow U.S. EPA or its authorized representatives to take

split or duplicate samples of any samples collected by Respondents with regard to air monitoring, sampling of backfill, or characterization phase material. In addition, U.S. EPA shall have the right to take any additional samples that U.S. EPA deems necessary.

XIII. COMPLIANCE WITH APPLICABLE LAWS

51. All actions by Respondents taken pursuant to this Order shall be performed in accordance with the requirements of all applicable federal and State laws and regulations. U.S. EPA has determined that the activities contemplated by this Order are not inconsistent with the National Contingency Plan.

52. Except as provided in § 121(e) of CERCLA and in the NCP, no permit shall be required for any portion of the Work conducted entirely on-Site. Where any portion of the Work, including off-Site activities necessary for completion of the Work, requires a federal or State permit, Respondents shall submit timely applications and take all other actions necessary to obtain and to comply with all such permits or approvals.

53. This Order is not and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

XIV. REMEDIAL PROJECT MANAGER/ON-SCENE COORDINATOR

54. All communications, whether written or oral, from Respondents to U.S. EPA shall be directed to U.S. EPA's RPM/OSC, unless the RPM/OSC directs Respondents otherwise. Except in emergency situations, communications from Respondents should not be directed to the Alternate RPM/OSC without prior direction from the RPM/OSC. Respondents shall submit to U.S. EPA as many copies of any documents, including plans, reports, and other correspondence, which are developed pursuant to this Order as the RPM/OSC requires, and shall send these documents by certified mail (return receipt requested) or by express mail.

U.S. EPA's Remedial Project Manager/On-scene Coordinator is:

David Seely
Superfund Division
U.S. EPA, Region 5
77 W. Jackson Blvd. (SR-6J)
Chicago, Illinois 60604-3590
312/886-7058

U.S. EPA's Alternate RPM/OSC is:

Rebecca Frey
Superfund Division
U.S. EPA, Region 5
77 W. Jackson Blvd. (SR-6J)
Chicago, Illinois 60604-3590
312/886-4760

55. U.S. EPA may change its RPM/OSC or Alternate RPM/OSC. If U.S. EPA changes its RPM/OSC or Alternate RPM/OSC, U.S. EPA will

inform Respondents in writing of the name, address, and telephone number of the new RPM/OSC or Alternate RPM/OSC.

56. U.S. EPA's RPM/OSC and Alternate RPM/OSC shall have the authority lawfully vested in a Remedial Project Manager (RPM) and On-Scene Coordinator (OSC) by the National Contingency Plan. U.S. EPA's RPM/OSC or Alternate RPM/OSC shall have authority, consistent with the NCP, to halt any Work required by this Order, and to take any necessary response action.

XV. PROJECT COORDINATOR AND CONTRACTORS

57. All aspects of the Work to be performed by Respondents pursuant to this Order shall be under the direction and supervision of a Project Coordinator qualified to undertake and complete the requirements of this Order. The Project Coordinator shall be the RPM/OSC's primary point of contact with Respondents and shall possess sufficient technical expertise regarding all aspects of the Work. Within five (5) working days after the effective date of this Order, Respondents shall notify U.S. EPA in writing of the name and qualifications of the Project Coordinator, including primary support entities and staff, proposed to be used in carrying out the Work. U.S. EPA reserves the right to disapprove the proposed Project Coordinator.

58. Within seven (7) days after U.S. EPA approves the Work Plan, Respondents shall identify a proposed construction contractor and notify U.S. EPA in writing of the name, title, and qualifications of the construction contractor proposed to be used in carrying out the Work.

59. Respondents shall submit a copy of the construction contractor solicitation documents to U.S. EPA not later than five (5) days after publishing the solicitation documents. Upon U.S. EPA's request, Respondents shall submit complete copies of all bid packages received from all contract bidders.

60. At least seven (7) days prior to commencing any Work at the Site pursuant to this Order, Respondents shall submit to U.S. EPA a certification that Respondents or its contractors and subcontractors have adequate insurance coverage or have indemnification for liabilities for injuries or damages to persons or property which may result from the activities to be conducted by or on behalf of Respondents pursuant to this Order. Respondents shall ensure that such insurance or indemnification is maintained for the duration of the Work required by this Order.

61. U.S. EPA retains the right to disapprove of the Project Coordinator and any contractor retained by Respondents. In the

event U.S. EPA disapproves a Project Coordinator or contractor, Respondents shall retain a new project coordinator or contractor to perform the Work, and such selection shall be made within seven (7) days following the date of U.S. EPA's disapproval. If at any time Respondents propose to use a new project coordinator or contractor, Respondents shall notify U.S. EPA of the identity of the new project coordinator or contractor at least fifteen (15) days before the new project coordinator or contractor performs any Work under this Order.

XVI. SITE ACCESS AND DOCUMENT AVAILABILITY

62. Respondents shall provide or obtain access to the Site and off-site areas to which access is necessary to implement this Order, and shall provide access to all records and documentation related to the conditions at the Site and the actions conducted pursuant to this Order. Such access shall be provided to EPA employees, contractors, agents, consultants, designees, representatives, and State representatives. These individuals shall be permitted to move freely at the Site and appropriate off-site areas in order to conduct actions which EPA determines to be necessary. Respondents shall submit to EPA, upon request, the results of all sampling or tests and all other data generated by Respondents or their contractor, or on the Respondents' behalf during implementation of this Order.

63. In all cases, Respondents shall use their best efforts to obtain a written agreement for access to the properties not owned by Respondents, including providing reasonable compensation in consideration of access. Said agreements shall provide access for U.S. EPA, its contractors and oversight officials, the State and its contractors, and Respondents or Respondents' authorized representatives and contractors. Said agreements shall specify that Respondents are not U.S. EPA's representatives with respect to liability associated with Site activities. Copies of such agreements shall be provided to U.S. EPA prior to Respondents' initiation of field activities at those properties. If access agreements are not obtained within the time referenced above, Respondents shall promptly notify U.S. EPA of their failure to obtain access.

64. If Respondents cannot obtain the necessary access agreements, U.S. EPA may exercise non-reviewable discretion to: (1) use its legal authorities to obtain access for Respondents; (2) conduct response actions at the property in question; or (3) terminate this Order. If U.S. EPA conducts a response action and does not terminate the Order, Respondents shall perform all other removal actions required by this Order that do not require access to that property. Respondents shall integrate the results of any such tasks undertaken by U.S. EPA into their reports and deliverables. Respondents shall reimburse U.S. EPA upon written

demand for all response costs (including attorney fees) incurred by the United States to obtain access for Respondents.

65. Respondents shall allow U.S. EPA and its authorized representatives and contractors to enter and freely move about all property at the Site and off-Site areas subject to or affected by the Work under this Order or where documents required to be prepared or maintained by this Order are located, for the purposes of inspecting conditions, activities, the results of activities, records, operating logs, and contracts related to the Site or Respondents and their representatives or contractors pursuant to this Order; reviewing the progress of Respondents in carrying out the terms of this Order; conducting tests as U.S. EPA or its authorized representatives or contractors deem necessary; using a camera, sound recording device or other documentary type equipment; and verifying the data submitted to U.S. EPA by Respondents. Respondents shall allow U.S. EPA and its authorized representatives to enter the Site, to inspect and copy all records, files, photographs, documents, sampling and monitoring data, and other writings related to Work undertaken in carrying out this Order. Nothing herein shall limit U.S. EPA's right of entry or inspection authority under federal law, and U.S. EPA retains all of its information gathering and enforcement authorities and rights under CERCLA, RCRA, and any other applicable statutes and regulations.

their employees, agents, or representatives for purposes of investigation, information gathering or testimony concerning the performance of the Work.

68. Until ten (10) years after U.S. EPA provides notice pursuant to Paragraph 83 of this Order, Respondents shall preserve, and shall instruct their contractors and agents to preserve, all documents, records, and information of whatever kind, nature or description relating to the performance of the Work. Upon the conclusion of this document retention period, Respondents shall notify the United States at least ninety (90) days prior to the destruction of any such records, documents or information, and, upon request of the United States, Respondents shall deliver all such documents, records and information to U.S. EPA.

69. Respondents may assert a claim of business confidentiality covering part or all of the information submitted to U.S. EPA pursuant to the terms of this Order under 40 C.F.R. § 2.203, provided such claim is not inconsistent with § 104(e)(7) of CERCLA or other provisions of law. This claim shall be asserted in the manner described by 40 C.F.R. § 2.203(b) and substantiated by Respondents at the time the claim is made. Information determined to be confidential by U.S. EPA will be given the protection specified in 40 C.F.R. Part 2. If no such claim accompanies the information when it is submitted to U.S. EPA, it

XVIII. DELAY IN PERFORMANCE

71. Any delay in performance of this Order according to its terms and schedules that U.S. EPA deems is not properly justified by Respondents under the terms of this Section shall be considered a violation of this Order. Any delay in performance of this Order shall not affect Respondents' obligations to fully perform all obligations under the terms and conditions of this Order.

72. Respondents shall notify U.S. EPA of any delay or anticipated delay in performing any requirement of this Order. Such notification shall be made by telephone to U.S. EPA's RPM/OSC or Alternate RPM/OSC within forty-eight (48) hours after Respondents first knew or should have known that a delay might occur. Respondents shall adopt all reasonable measures to avoid or minimize any such delay. Within seven (7) days after notifying U.S. EPA by telephone, Respondents shall provide written notification fully describing the nature of the delay, any justification for delay, any reason why Respondents should not be held strictly accountable for failing to comply with any relevant requirements of this Order, the measures planned and taken to minimize the delay, and a schedule for implementing the measures that will be taken to mitigate the effect of the delay. Increased costs or expenses associated with implementation of the

activities called for in this Order is not a justification for any delay in performance.

XIX. UNITED STATES NOT LIABLE

73. The United States and U.S. EPA are not to be construed as parties to, and do not assume any liability for, any contract entered into by Respondents to carry out the activities pursuant to this Order. The proper completion of the Work under this Order is solely the responsibility of Respondents. The United States and U.S. EPA, by issuance of this Order, also assume no liability for any injuries or damages to persons or property resulting from acts or omissions by Respondents, or their directors, officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out any action or activity required by this Order.

XX. ENFORCEMENT AND RESERVATIONS

74. U.S. EPA reserves the right to bring an action against Respondents under § 107 of CERCLA for recovery of any response costs incurred by the United States related to this Order, the Site or any other site at which Respondents may be a liable person. This reservation shall include but not be limited to past costs, direct costs, indirect costs, the costs of oversight, the costs of compiling the cost documentation to support

oversight cost demand, as well as accrued interest as provided in § 107(a) of CERCLA.

75. Notwithstanding any other provision of this Order, at any time during the removal actions, U.S. EPA may perform its own studies, complete the removal actions (or any portion of the removal actions) as provided in CERCLA and the NCP, and seek reimbursement from Respondents for its costs, or seek any other appropriate relief.

76. Should Respondents violate this Order or any provision hereof, EPA may terminate this Order and carry out the required removal actions unilaterally, pursuant to Section 104 of CERCLA, and/or may seek judicial enforcement of this Order pursuant to Section 106 of CERCLA.

77. Nothing in this Order shall preclude U.S. EPA from taking any additional enforcement actions, including modification of this Order or issuance of additional Orders, and/or additional remedial or removal actions as U.S. EPA may deem necessary, or from requiring Respondents in the future to perform additional activities pursuant to CERCLA or any other applicable law. This Order shall not affect Respondents' liability under CERCLA § 107(a) for the costs of any such additional actions.

78. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection and enforcement authorities and rights under CERCLA, RCRA and any other applicable statutes or regulations.

79. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person for any liability it may have arising out of or relating in any way to the Site.

80. If a court issues an order that invalidates any provision of this Order or finds that Respondents have sufficient cause not to comply with one or more provisions of this Order, Respondents shall remain bound to comply with all provisions of this Order not invalidated by the court's order.

XXI. ACCESS TO ADMINISTRATIVE RECORD

81. The Section 106 Administrative Record is available for review on normal business days between the hours of 9:00 a.m. and 5:00 p.m. at the U.S. EPA, Region V, 77 West Jackson Boulevard Chicago, Illinois. An Index of the Administrative Record is attached hereto as Appendix 1.

XXII. EFFECTIVE DATE AND TERMINATION

82. This Order shall become effective twelve (12) days after the date of issuance.

83. After it receives Respondents' certification of completion under Paragraph 43, U.S. EPA may require such additional activities as may be necessary to complete the Work or U.S. EPA may, based upon such certification and U.S. EPA's concurrent knowledge, issue written notification to Respondents that the Work has been completed, as appropriate. U.S. EPA's notification shall not limit U.S. EPA's right to take or require any action that in the judgment of U.S. EPA is appropriate at the Site, in accordance with Section 104, 106 or 107 of CERCLA. The provisions of this Order shall be deemed to be satisfied when U.S. EPA notifies Respondents in writing that Respondents have demonstrated, to U.S. EPA's satisfaction, that all terms of the Order have been completed. This notice shall not, however, terminate Respondent's obligation to comply with Section XVII (Record Preservation).

XXIII. NOTICE OF INTENT TO COMPLY

84. On or before the effective date of this Order, Respondents must submit to U.S. EPA a written notice stating the unequivocal intention to comply with all terms of this Order. In

the event Respondents fail to provide said written notice of their unequivocal intention to comply with this Order on or before the effective date, Respondents shall be deemed to have refused to comply with this Order. If Respondents fail to provide timely notice of their intent to comply with this Order, it shall thereafter have no authority to perform any response action at the Site, pursuant to §§ 104(a) and 122(e)(6) of CERCLA. In the event Respondents subsequently change their decision and desire to acquire authority from U.S. EPA under §§ 104(a) and 122(e)(6) of CERCLA to undertake the Work described in this Order, Respondents must provide the notice described in this Paragraph to U.S. EPA and receive from U.S. EPA written permission and authority to proceed with Work under this Order.

XXIV. PENALTIES

85. Respondents shall be subject to civil penalties under § 106(b) of CERCLA, 42 U.S.C. § 9606(b), of not more than $25,000 for each day in which Respondents violate, or fail or refuse to comply with this Order without sufficient cause. In addition, failure to properly provide removal actions under this Order, or any portion hereof, may result in liability under § 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), for punitive damages in an amount at least equal to, and not more than three times the amount of any costs incurred by the Fund as a result of such failure to take proper action.

XXV. OPPORTUNITY TO CONFER

86. On or before the effective date of this Order, Respondents may submit written comments to U.S. EPA. If Respondents assert a "sufficient cause" defense under § 106(b) of CERCLA, Respondents shall describe the nature of any "sufficient cause" defense using facts that exist on or prior to the effective date of this Order. The absence of a response by U.S. EPA shall not be deemed to be acceptance of Respondents' assertions.

87. Within five (5) days after the date of issuance of this Order, Respondents may request a conference with the U.S. EPA to discuss this Order. If requested, the conference shall occur within 12 (twelve) days of the date of issuance of this Order, at the office of U.S. EPA, Region 5, in Chicago, Illinois.

88. The purpose and scope of the conference shall be limited to issues involving the implementation of the Work and the extent to which Respondents intend to comply with this Order. This conference is not an evidentiary hearing and does not constitute a proceeding to challenge this Order. It does not give Respondents a right to seek review of this Order or to seek resolution of potential liability. No record of the conference (e.g. stenographic, tape or other physical record) will be made. At any conference held pursuant to Respondents' request, Respondents may appear in person or by an attorney or other representative. Requests for a conference must be by telephone followed by written confirmation to U.S. EPA's RPM/OSC.

ADMINISTRATIVE ORDER FOR KERR-McGEE REED KEPPLER PARK SUPERFUND SITE

So Ordered, this 25th day of September, 1996

BY: _____

William E. Muno, Director
Superfund Division
U.S. Environmental Protection Agency, Region V

List of Attachments

1. Statement of Work

2. Action Memorandum for Site, March 1996

3. Action Criteria Document for Residential Areas Site, November 1993

ATTACHMENT 1

STATEMENT OF WORK

STATEMENT OF WORK FOR THE KERR-McGEE REED-KEPPLER PARK SUPERFUND SITE WEST CHICAGO, ILLINOIS

I. PURPOSE

The purpose of this Statement of Work ("SOW") is to set forth the requirements for implementation of time-critical removal actions at the Kerr-McGee Reed-Keppler Park Superfund Site ("Site"). Respondents shall implement all Work described in this SOW in accordance with the Order to which this SOW is attached and the Action Memorandum. In the event of any inconsistency between this SOW and the Order, the Order shall govern.

II. DESCRIPTION OF THE TIME-CRITICAL REMOVAL ACTION TO BE CONDUCTED BY RESPONDENTS

The activities associated with the time-critical removal action are being conducted in three phases. Respondents shall conduct the activities, as generally described in Paragraphs II.A. and II.B. below. United States Environmental Protection Agency (EPA) and/or Illinois Department of Nuclear Safety (IDNS) intend to conduct other phases of the activities, as generally described in paragraph II.C. below.

A. **CHARACTERIZATION AND DELINEATION PHASE**: During this phase, the Respondents shall conduct an investigation to further characterize and delineate the extent of contamination existing at the Site above the discovery and characterization criteria defined in the Action Criteria document. Additionally this investigation shall gather sufficient information to allow Respondents to plan and design the removal of contamination above the cleanup level. Within seven days of the effective date of the Order, EPA intends to provide Respondents with the initial characterization information collected during the Remedial Investigation field activities conducted by EPA. The Respondents shall develop and submit a work plan subject to review and approval by EPA which identifies activities associated with the characterization and delineation phase. This work plan shall include a Health & Safety Plan, Field Sampling Plan and a Quality Assurance Project Plan which cover activities in the characterization and delineation phase. Upon EPA approval, the Respondents shall conduct the investigation subject to the schedule defined in the work plan. Upon completion of this investigation, the Respondents shall provide a characterization and delineation report to EPA. This report shall include the results of the characterization and delineation investigation and identify proposed areas in Reed-Keppler Park which exceed the discovery and characterization criteria and need to beremediated. EPA will review this report and identify to the Respondents which areas will require remediation.

B. **EXCAVATION AND RESTORATION PHASE**: The Respondents shall submit a work plan to EPA within thirty (30) days of the effective date of the Order for review covering the excavation and restoration phase. It is anticipated that this document will provide all general information which will not be affected by the results of the characterization and delineation phase work. Information which may be affected should be provided to the extent possible with the caveat that it may change based upon the characterization and delineation phase results. The Respondents shall submit to EPA a draft Excavation and Restoration Work Plan along with the characterization and delineation report which supplements the work plan specified above. During this phase, Respondents shall remove contaminated materials from each area of the site that EPA determines exceed the discovery and characterization criteria and notifies Respondents pursuant to Paragraph II.a. the contaminated areas require Excavation and Restoration Phase Work. As used in this SOW, "contaminated materials" means soils that exceed the discovery and characterization criteria and any other materials (e.g., concrete, wood, debris) that have become contaminated with hazardous substances as a result of the thorium mill tailings at the Site. Respondents shall excavate contaminated materials from each such area of the site to levels that meet the verification criteria. Prior to backfilling any excavated area with clean soil, Respondents shall notify EPA that Respondents believe the cleanup criteria have been met in that area. EPA/IDNS then intend to conduct verification activities (described below). If EPA, in consultation with IDNS, determines that the cleanup criteria have not been met, Respondents shall conduct additional excavation work as necessary to meet the verification criteria. If EPA, in consultation with IDNS, determines that the verification criteria have been met at an excavated area, EPA shall notify Respondents, and Respondents shall: backfill the excavation with clean soils to provide a Subtitle D landfill cover which substantively complies with the Solid Waste Disposal Act over any non-thorium related wastes left in place; prevent precipitation run on; provide measures for controlling runoff; and shall appropriately restore the site for recreational uses or to such other condition as the property owner has approved in writing.

Limited expedited excavations may take place prior to the formal approval of the excavation and restoration work plan only on previously identified contaminated areas outside the fenced area in order to minimize the impact on the recreational uses of the park. In these limited cases, the Respondents shall prepare and submit to EPA for review and approval a mini-work plan which specifies all activities, including restoration, to be implemented. After approval by EPA, the Respondents shall implement these limited excavations and restorations as soon as practicable. Verification, backfilling, and restoration of these areas will be conducted consistent with the requirements specified above.

C. **VERIFICATION PHASE**: During this phase, EPA/IDNS intend to conduct sampling, surveying and testing activities to determine whether the verification criteria have been met at all areas undergoing the Excavation and Restoration Phase Work.

EPA/IDNS indend to conduct this phase of the project at each such area: 1) after excavation Work but before backfilling and restoration Work, i.e., after Respondents have notified EPA that they believe they have met the verification criteria; and 2) after backfilling of the excavation. For the verification activities that occur in the open excavation, EPA will notify Respondents whether the verification criteria have been met so the excavation may be backfilled and the property restored.

A more detailed description of the Work to be conducted by Respondents during the Excavation and Restoration Phase is provided below:

1. Access Agreements

Respondents shall obtain access agreements to any areas of the Site not under their control as provided in Section V of the Order (Access to Property).

2. Excavation of Contaminated Areas

Within 7 days after U.S. EPA's approval of Respondents' Excavation and Restoration Phase Work Plan ("Work Plan") (described in Section III of this SOW and Section VIII of the Order), Respondents shall begin excavation Work in the areas that EPA has identified as requiring excavation. All excavation Work shall be conducted to meet the cleanup criteria using such procedures and equipment as necessary and appropriate and as described in the approved Work Plan. Respondents shall supply adequate staffing of excavation crews to ensure that Work at the Site is conducted without unnecessary delay.

As part of the monthly written progress report described in Section XI of the Order (Reporting), Respondents shall submit a monthly schedule containing a list of activities to be conducted in the subsequent 45 days.

During its review of the monthly schedules, EPA may re-prioritize certain activities that EPA determines will minimize any potential exposures to the community and significant detrimental effects on recreational activities at the park. Respondents shall conduct excavations at the areas in the order of precedence established in the approved schedule.

After all excavation activities within an area have been completed and prior to backfilling any area, the Respondents shall document the extent of excavation, document the locations and generally characterize any landfilled wastes which may be left in place. These activities shall be implemented consistent with the procedures specified in the approved Work Plan.

When Respondents believe, after conducting excavation Work, that they have met the cleanup criteria in an area, they shall immediately notify EPA in accordance with the procedures established in the approved Work Plan and provide any supporting documentation. After receiving such notice, EPA/IDNS will conduct Verification Phase sampling, surveying and

testing of the specified area. If EPA, in consultation with IDNS, determines that the cleanup criteria have not been met, Respondents shall conduct additional excavation Work as necessary to meet the cleanup criteria and again notify EPA that they believe they have met the cleanup criterion of 7.2 pCi/g of dry soil. If EPA, in consultation with IDNS, determines that the cleanup criteria have been met, EPA shall so notify Respondents, and Respondents shall commence restoration of the property.

3. Restoration of Work Areas

After EPA has notified Respondents that Respondents have met the cleanup criteria at an area based on EPA/IDNS surveys, samples and tests in the open excavation, Respondents shall begin restoration of the area as promptly as is practicable, but no later than 7 days after the receipt of such notice, or otherwise specified in the Excavation and Restoration Work Plan. Respondents shall complete restoration of the area as expeditiously as practicable. Respondents shall use clean soils, determined by sampling, to backfill the areas from which contaminated materials have been excavated, and shall re-establish previous contours. In areas where landfilled wastes remain after the cleanup criteria have been met, the Respondents shall provide a landfill cover which substantively complies with RCRA Subtitle D requirements for landfill closures. Any waste left in place may be consolidated to minimize the landfill cover requirements. Excavated and/or disturbed areas shall be restored, to the extent practicable, to original conditions or such other conditions as the owner of the property may approve in writing. Sod or appropriate grass seed shall be used for areas that were grass-covered prior to excavation and Respondents shall replace any vegetation that has been removed with appropriate nursery stock to the extent practicable.

After restoration of an area, Respondents shall obtain written acceptance of the restoration Work from the property owner, showing that the property owner agrees that Respondents have fulfilled their agreement to restore the property. In the event that Respondents and the property owner cannot reach an agreement that the property has been properly restored, the EPA Remedial Project Manager ("RPM") shall resolve the dispute. Respondents shall promptly take any actions the EPA RPM deems necessary to restore the area.

Respondents shall supply adequate staffing of restoration crews to ensure that Work at the Site is conducted without unnecessary delay.

4. Handling, Transportation and Disposal of Excavated Materials

The contaminated materials at this Site have been classified as "11(e)(2) byproduct material" as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. § 2014(e)(2). As soon as possible after excavation Work at any area, but in no case later than the end of the work day, Respondents shall transport all contaminated materials away from the Site to a facility licensed to accept 11(e)(2) byproduct material, in accordance with the procedures in the approved Work

Plan. Transportation of contaminated materials shall be done in accordance with applicable Department of Transportation and IDNS regulations.

Respondents shall arrange for the disposal of all contaminated materials removed from affected areas pursuant to this SOW at a permanent disposal facility licensed to accept and permanently dispose of 11(e)(2) byproduct material.

Respondents shall track all materials excavated or removed from the Site by keeping a log of all activities. Such information shall include, at a minimum, dates of excavation and volumes of materials excavated from affected areas, dates and volumes of materials handled and transported away from such areas, and dates and volumes of materials transported to the licensed permanent disposal facility or facilities. Such information shall be transmitted to EPA in electronic format suitable for incorporation into EPA's electronic database for this Site.

5. Dust Control Measures and Air Monitoring

During all excavation, transportation and associated contaminated materials-handling Work, Respondents shall implement dust control measures to minimize the occurrence of dust and/or contaminated soil from becoming airborne. Respondents shall conduct monitoring near excavation locations to provide both for worker protection and protection of the general public from contaminated dust emissions. Respondents shall include in the Work Plan a detailed description of the dust control measures and monitoring that will be implemented during the Excavation and Restoration Phase. Corrective measures shall be taken according to the Work Plan at all times when visible dust is generated from site activities.

III. SCOPING AND PLANNING DOCUMENTS FOR REMOVAL ACTION

Respondents shall prepare and submit to EPA for review and approval as provided in Section VII of the Order the scoping and planning documents described below. The approved documents will become enforceable parts of the Order. The documents shall describe in detail the steps to be taken to implement the design, construction, operation and maintenance of the Excavation and Restoration Phase at the Site. Respondents are responsible for the timely implementation of the Excavation and Restoration Phase Work in accordance with the EPA-approved plans. The schedule for submittal of the documents is described in Section IV of this SOW.

Task 1: Characterization and Delineation Phase Work

Subtask A: Characterization and Delineation Work Plan
Subtask B: Characterization and Delineation Report

Task 2: Excavation and Restoration Phase Work

Subtask A: Excavation Plan
Subtask B: Dust Control Plan
Subtask C: Air Monitoring Plan
Subtask D: Permitting and Access Requirement Plan
Subtask E: Traffic Control Plan
Subtask F: Site Security Plan
Subtask G: Pre-Verification Screening Sampling Plan
Subtask H: Restoration Plan

Task 3: Quality Assurance Project Plan and Field Sampling Plan

Task 4: Construction Quality Assurance Plan

Task 5: Health and Safety Plan

Task 6: Emergency Contingency Plan

Task 7: Preconstruction Meeting and Routine Progress Meetings

Task 1: Characterization and Delineation Phase Work

Respondents shall submit a Work Plan ("Characterization and Delineation Work Plan") for EPA review and approval in accordance with Section VII of the Order (Work to be Performed), and in accordance with the schedule in Section IV of this SOW. The Work Plan shall contain detailed descriptions of the plans for the subtasks listed below:

Subtask A: Characterization and Delineation Work Plan

Within fourteen days of the effective date of the Order, the Respondents shall provide to EPA a Characterization and Delineation Work Plan which describes the proposed work required by this paragraph. The Work Plan shall specify the Respondents' approach to delineate all areas of contamination present at the site and include rationale to be utilized to identify areas of contamination requiring excavation. Also, this plan should identify methods for obtaining any information necessary to determine appropriate waste handling procedures. At a minimum, this Work Plan shall identify the type, numbers and approximate locations of all proposed sampling activities. This plan shall include the Health & Safety Plan, Sampling Plan, and Quality Assurance Project Plan which cover activities to be undertaken during this phase. Additionally, this Work Plan shall identify the schedule of activities to expedite the overall removal.

Subtask B: Characterization and Delineation Report

Subject to the schedule identified by the Characterization and Delineation Work Plan, the Respondents shall submit a Characterization and Delineation Report. This report shall include, at a minimum, sample results, sample methods utilized, deviations from the original work plan, and the rationale and recommendations of areas requiring excavation.

Task 2: Excavation and Restoration Phase Work

Respondents shall submit to EPA within thirty (30) days of the effective date of the Order a Work Plan for review and approval in accordance with Section VII of the Order (Work to be Performed), and in accordance with the schedule in Section IV of this SOW. This Work Plan shall provide all general information which is unaffected by the characterization and delineation phase work. Also this plan should identify the initial excavation strategy which will be supplemented by detailed ammendments for specific areas after the characterization and delineation phase results are available. The Work Plan shall document and detail the overall scope and management strategy for performing the design, construction, operation, maintenance and monitoring of the Excavation and Restoration Phase Work. The Work Plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation of the Excavation and Restoration Phase Work and shall include a description of qualifications of key personnel directing the activities, including key contractor personnel and leaders of the excavation/ restoration work crews. The Work Plan shall describe in detail the equipment, procedures and materials that may be used during all phases of the Excavation and Restoration Phase Work (including excavation, restoration, materials handling and transportation), including identification of the source and physical characteristics of the soil that will be used as backfill to restore excavated areas. The Work Plan shall describe the notification procedures to be used to notify EPA when Respondents believe, after excavation but before backfilling, that they have met the cleanup criteria at areas designated for excavation and restoration Work. In addition, the Work Plan shall describe the data to be collected and recorded by Respondents in connection with the Excavation and Restoration Phase Work and the procedures for transferring that information to EPA as that Work progresses. If at all possible, such information shall be transmitted to EPA in electronic format suitable for incorporation into EPA's electronic database for this Site. The Work Plan also shall contain a schedule for the Excavation and Restoration Phase Work.

In addition to addressing the above-listed items, the Work Plan shall contain detailed descriptions of the plans for the subtasks listed below:

Subtask A: Excavation Plan

Respondents shall submit an Excavation Plan which shall describe in detail, at a minimum, the methods to be employed during the excavation. This plan shall provide the Respondents' strategy for handling all types of wastes which may be encountered during the excavation, any segregation methods for separating the radioactive contaminated wastes from any other landfilled wastes encountered, and any special handling procedures to be utilized during the excavation work. This plan shall identify any planned stockpile areas and methods to be used to control environmental releases from such stockpiles (i.e., run on/runoff protection, dust/radioactive particulate emissions, etc.). In addition, this plan shall identify proposed schedules for all excavations to be conducted.

This plan shall be supplemented with detailed plans for specific areas of excavation once the characterization and delineation results are available and will be submitted to EPA in accordance with the schedule contained in the Characterization and Delineation Work Plan.

Subtask B: Dust Control Plan

Respondents shall submit a Dust Control Plan which shall describe in detail, at a minimum, the methods to be employed during all phases of the Excavation and Restoration Phase (including excavation, restoration, transportation and associated materials handling Work) to minimize the occurrence of dust and/or contaminated soil from becoming airborne, and the corrective measures to be implemented in the event that excessive dust and/or contaminated soil becomes airborne. If water is used as a dust control measure, the plan shall describe the procedures that will be used to control or contain runoff.

Subtask C: Air Monitoring Plan

Respondents shall submit an Air Monitoring Plan which shall describe in detail, at a minimum, the methods to be used to conduct air monitoring around the excavation locations. Monitoring near excavation locations shall be conducted as necessary to ensure that excessive airborne contaminated dust or nuisance dust are not being released from site activities. Monitoring shall be conducted both within restricted excavation areas (for worker protection) and at the perimeter of and/or outside restricted areas (for protection of the general public). This plan will be supplemented when results are available and as specified by the Characterization and Delineation Work Plan.

Subtask D: Permitting and Access Requirement Plan

Respondents shall submit a plan which shall outline and include, at a minimum, a comprehensive list of all permits required in conjunction with the Excavation and Restoration Phase Work, procedures and estimated time frames for acquiring required permits, procedures and methods to be implemented to ensure compliance with permitting requirements, and procedures and methods to be implemented to obtain access and to follow up when access is not obtained. The plan also shall describe the procedures to be used to ensure that buried underground utilities are not damaged during removal activities, and corrective measures to be taken in the event that such damage occurs.

Subtask E: Traffic Control Plan

Respondents shall submit a plan which shall describe the procedures to be used to control traffic in the event that excavation/restoration Work must be conducted on or near roadways or sidewalks. Additionally, this plan shall include provisions to minimize the impact of access for the West Chicago Park District personnel to their work areas and the impact on any organized recreational activities held in the park. This plan will be supplemented when the results are available and as specified by the Characterization and Delineation Work Plan.

Subtask F: Site Security Plan

Respondents shall submit a plan which shall describe in detail the procedures that shall be used to prevent access from the general public to areas where excavation/ restoration Work is being conducted, including those times when an excavation is left open during periods of no on-Site activity. This plan shall include all provisions necessary to restrict public access to work areas necessary to protect public health while recognizing the high recreational activity levels in the park.

Subtask G: Pre-Verification Screening Sampling Plan

Respondents shall submit a plan which shall describe in detail the field methods, sampling procedures and analytical methods that Respondents will use during excavation activities, prior to the verification activities that will be conducted by EPA/IDNS, to determine when Respondents believe they have met the cleanup criteria at an excavated area. The plan shall contain sufficient information to ensure that, if Respondents follow such methods and procedures, EPA/IDNS verification activities will indeed confirm that the cleanup criteria have been met. (Note that this plan is not a Quality Assurance Project Plan.) Respondents shall use adequate field and laboratory instruments, in up-to-date calibration and good working order, to perform the pre-verification screening sampling.

Subtask H: Restoration Plan

Respondents shall submit for review and approval by EPA a Restoration Plan which shall describe in detail, at a minimum, the methods to be employed during the restoration activities. This plan shall provide the Respondents' strategy for restoring the site to original condition, to the extent practical. This plan shall detail proposed final contours and any vegetation needed for restoring the site. In addition, this plan shall provide schedules for restoration of individual areas and the site as a whole. This plan will be supplemented when the results are available and as specified by the Characterization and Delineation Work Plan.

Task 3: Quality Assurance Project Plan and Field Sampling Plan

Respondents shall develop a Quality Assurance Project Plan (QAPP) and a Field Sampling Plan (FSP) for the following limited aspects of the Work:

1) Characterization and delineation investigation activities;

2) Air monitoring activities; and

3) Sampling of backfill material to ensure that the material used to restore excavated properties is clean, meaning that the radiological and chemical composition of the backfill material must be within background ranges for the Site as established by EPA.

The FSP shall supplement the QAPP and shall address all sample collection activities associated with the above-listed aspects of the Work.

Respondents shall attend a pre-QAPP meeting with U.S. EPA prior to preparation of the QAPP. The QAPP shall address all sample analysis and data handling for the above-listed aspects of the work, and shall be prepared in accordance with the U.S. EPA Region 5 model QAPP. The QAPP shall at a minimum include:

Project Description
* Facility Location History
* Past Data Collection Activity
* Project Scope
* Sample Network Design
* Parameters to be Tested and Frequency
* Project Schedule

Project Organization and Responsibility
Quality Assurance Objectives for Measurement Data

* Level of Quality Control Effort
* Accuracy, Precision and Sensitivity of Analysis *

Completeness, Representativeness and Comparability

Sampling Procedures

Sample Custody
* Field Specific Custody Procedures
* Laboratory Chain of Custody Procedures

Calibration Procedures and Frequency
* Field Instruments/Equipment
* Laboratory Instruments

Analytical Procedures
* Non-Contract Laboratory Program Analytical Methods
* Field Screening and Analytical Protocol
* Laboratory Procedures

Internal Quality Control Checks
* Field Measurements
* Laboratory Analysis

Data Reduction, Validation and Reporting
* Data Reduction
* Data Validation
* Data Reporting

Performance and System Audits
* Internal Audits of Field Activity
* Internal Laboratory Audit
* External Field Audit
* External Laboratory Audit

Preventive Maintenance
* Routine Preventive Maintenance Procedures and Schedules
* Field Instruments/Equipment
* Laboratory Instruments

Specific Routine Procedures to Assess Data Precision, Accuracy and Completeness

* Field Measurement Data
* Laboratory Data

Corrective Action

* Sample Collection/Field Measurement
* Laboratory Analysis

Quality Assurance Reports to Management

Task 4: Construction Quality Assurance Plan

Respondents shall submit a Construction Quality Assurance (CQA) Plan which describes the site-specific components of the quality assurance program that Respondents will use to ensure that the physical characteristics of the soil being used as backfill material are appropriate for the intended use of the area (e.g., can support structures, roadways, etc.) and that backfilled areas will maintain their contours over the long term (i.e., backfilled areas will not settle).

The CQA Plan shall describe the qualifications of the CQA officer and supporting inspection personnel to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities. The CQA Plan also shall describe the proposed quality assurance sampling activities that will be used to monitor the construction, including the scope and frequency of each type of sampling activity, acceptance and rejection data sheets, and all associated documentation. Reporting requirements for CQA activities shall be described in detail in the CQA Plan, as well as provisions for the final storage of all records and documentation.

Task 5: Health and Safety Plan

Respondents shall develop a Health and Safety Plan which is designed to protect on-site personnel and area residents from physical, chemical, radiological and all other hazards posed by excavation and restoration Work. Respondents shall designate a Health Physicist as a Health and Safety officer to ensure that all Work associated with such excavation and restoration is conducted in a manner protective to the workers and local residents. The Health and Safety officer shall be responsible for ensuring that the

Health and Safety Plan is followed by all employees and contractors of Respondents. The Health and Safety Plan shall develop the performance levels and specifications necessary to address the following areas:

Site Description
Personnel
Levels of Protection
Safe work practices and safeguards
Concepts and methodologies to be followed by workers to keep radiation doses "As Low As Reasonably Achievable" (ALARA)
Procedures for weather-related problems (such as hypothermia, heat stress and heat exhaustion)
Special training required for work crews and on-site personnel
Medical surveillance
Personal and environmental air monitoring
Personal protective equipment
Personal hygiene
Decontamination - personnel and equipment
Site work zones and access control
Contaminant control
Procedures for conducting equipment release surveys and specification of release criteria
Contingency and emergency planning
Logs, reports and record keeping

The Health and Safety Plan shall follow U.S. EPA guidance and all OSHA requirements as outlined in 29 CFR 1910 and 1926.

Task 6: Emergency Contingency Plan

Respondents shall submit an Emergency Contingency Plan describing procedures to be used in the event of an accident or emergency at the Site. The Emergency Contingency Plan shall contain, at a minimum, the following:

1. Name of the person or entity responsible for responding in the event of an emergency incident.

2. Plan for meeting(s) with the local community, including local, State and Federal agencies involved in the cleanup, as well as local police, fire, utility and emergency personnel and hospitals.

3. First aid medical information.

4. Air Monitoring Plan

5. Spill Prevention, Control, and Countermeasures (SPCC) Plan, as specified in 40 CFR Part 109, describing measures to prevent and contingency plans for potential spills and discharges from materials handling and transportation.

Task 7: Preconstruction Meeting and Routine Progress Meetings

A. PRECONSTRUCTION MEETING

Before excavation Work pursuant to the approved plans and this SOW may commence, Respondents shall participate with the U.S. EPA and IDNS in a preconstruction meeting to:

1) Review methods for documenting and reporting data collected during the removal action;

2) Review lines of communication and methods to be used by Respondents to keep EPA and IDNS apprised of status of Work and notify EPA when Respondents believe that the cleanup criteria in an area have been met;

3) Review methods for distributing and storing documents and reports;

4) Review work area security, safety protocol and the Health and Safety and Emergency Contingency Plans;

5) Discuss any appropriate modifications to the Quality Assurance Project Plan and/or Construction Quality Assurance Plan to ensure that Site-specific considerations are addressed;

6) Review excavation methods, dust control measures, air monitoring methods, materials handling and transportation methods, equipment storage locations, and any other procedures relevant to implementation of the removal action;

7) Review instrument calibration methods, calibration frequencies, cross-checks at regular intervals and with U.S. EPA/IDNS instrumentation, and air monitor flow checks to assure data quality and confirm agreement between instruments; and

8) Revise schedules and sequence of activities as necessary.

9) Review potential impacts of work on the park personnel and organized scheduled activities and methods to minimize detrimental impacts.

B. ROUTINE PROGRESS MEETINGS

After excavation/restoration Work begins, Respondents shall participate in routine progress meetings with EPA and IDNS on a monthly basis or more frequently as determined by EPA. All of the items listed under item A above shall be reviewed and updated if necessary. Problems encountered or anticipated and solutions implemented or planned shall be discussed.

IV. SUMMARY OF MAJOR DELIVERABLES/SCHEDULE

A summary of the project schedule and reporting requirements contained in this SOW is presented below.

	Submission/Event	Due Date
1.	Characterization and Delineation Phase Work Plan	Fourteen (14) days after effective date of Order
2.	Excavation and Restoration Phase Work Plan	Thirty (30) days after effective date of Order
3.	QAPP/FSP	Fourteen (14) days after effective date of Order
4.	CQA Plan	Thirty (30) days after effective date of Order
5.	Health and Safety Plan	Fourteen (14) days after effective date of Order
6.	Emergency Contingency Plan	Twenty-one (21) days after effective date of Order
7.	Submit revised plans (see Section V of Order)	Within ten (10) days of receipt of U.S. EPA disapproval/ comments
8.	Obtain access to contaminated areas (see Section V of Order)	Secure access within fourteen (14) days of effective date of the Order.

9.	Preconstruction Meeting	Prior to any excavation work
10.	Begin characterization and delineation field activities	Within seven (7) days after EPA approval of the Characterization and Delineation Work Plan
11.	Submit Characterization and Delineation Report	As specified in Characterization and Delineation Work Plan
12.	Update Excavation and Restoration Work Plan	As specified in the Characterization and Delineation Work Plan
13.	Begin excavation activities (see Section II.2. of this SOW)	Within seven (7) days after U.S. EPA approval of Work Plan
14.	Transport excavated radiologically contaminated materials to licensed facility	As soon as possible after excavation
15.	Begin restoration activities at individual areas	Within seven (7) days of receipt of EPA notification that Verification Criteria have been met
16.	Complete restoration activities at individual areas	As defined in the Excavation and Restoration Work Plan
17.	Monthly Written Progress Reports (see Section XI of Order)	Within fifteen (15) days of end of Preceding month
18.	Routine Progress Meetings	Monthly after preconstruction meeting, or more frequently as determined by EPA
19.	Complete excavation/restoration Work at the site	As defined in the Excavation and Restoration Work Plan
20.	Submit Final Report (see Section VII of Order)	Sixty (60) days after completion of all on-Site Work

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

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SEP 13 1996

REPLY TO THE ATTENTION OF:

MEMORANDUM

DATE:

SUBJECT: ACTION MEMORANDUM - Determination of Threat to Public Health or Welfare or the Environment at the Kerr-McGee Reed-Keppler Park Site, DuPage County, Illinois (Reed-Keppler Park Site ID #QT)

FROM: David Seely
Remedial Project Manager/On-Scene Coordinator

TO: Valdas V. Adamkus
Regional Administrator

THRU: William E. Muno, Director
Superfund Division

I. PURPOSE

The purpose of this Action Memorandum (or "Action Memo") is to document the determination of an imminent and substantial threat to public health or welfare or the environment posed by the presence of contaminated soils at the Kerr-McGee Reed-Keppler Park Site ("RKP Site"), DuPage County, Illinois, and to document approval of the proposed time-critical removal action described herein.

The proposed removal action seeks to mitigate the imminent and substantial threat to human health and the environment posed by the presence of uncontrolled hazardous substances at the RKP Site, which is on the National Priorities List ("NPL"). The proposed removal action involves excavating contaminated soils/materials from the contaminated quarry and other areas in RKP, backfilling and restoring the excavated areas, and disposing of the soils/materials at a licensed permanent off-site disposal facility. Areas that will undergo removal action include any areas at the RKP NPL Site where thorium mill tailings from the Kerr-McGee West Chicago Rare Earths Facility ("REF") have come to be located and areas where the United States Environmental Protection Agency ("EPA") determines contamination exists which exceeds established cleanup criteria. The removal action is anticipated to be implemented by the potentially responsible parties ("PRPs").

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EPA recognizes that the RKP site is one of many cleanups in the West Chicago area which addresses similar contamination. Thorium mill tailing wastes originated from the REF. These wastes have come to be located at the four NPL sites in and around the City of West Chicago. The REF and the four NPL sites all address the cleanup of thorium mill tailing contamination. The cleanup of the REF is being conducted pursuant to the authority of the Illinois Department of Nuclear Safety ("IDNS").

As a result, EPA intends to utilize information previously generated from the cleanup efforts at the REF and the Residential Areas NPL Site where appropriate.

II. SITE CONDITIONS AND BACKGROUND

A). Reed-Keppler Park Site

Reed-Keppler Park Site: CERCLIS ID #ILD980824007.

This is a time-critical removal action.

The RKP NPL Site is located in the City of West Chicago, in DuPage County, Illinois, approximately 30 miles west of Chicago, Illinois. The RKP site is generally located north of National Street and west of Arbor Avenue (see Attachment 2). The RKP Site consists of areas within the park which encompass not only the contaminated quarry, but also areas beneath and around the tennis courts and other areas outside the quarry that became contaminated by thorium mill tailings from the REF (see Attachment 3). The mill tailings contain radionuclides and heavy metals. The areas became contaminated primarily because thorium mill tailings from the REF were used as fill or disposed of in the quarry.

The RKP NPL Site is one of four Kerr-McGee NPL sites in the West Chicago area. The other three NPL sites, the Residential Areas, Kress Creek and the Sewage Treatment Plant, are not addressed in this Action Memo. The REF, which is the source of the contamination at all four NPL sites, is not listed on the NPL, but is undergoing cleanup, closure and decommissioning activities under the jurisdiction of the Illinois Department of Nuclear Safety.

BACKGROUND

From approximately 1932 to 1973, the facility that is now known as the REF was operated by three different companies to extract thorium and other elements from various ores. The facility began operation in 1932, when the Lindsay Light and Chemical Company began producing thorium and other rare earth materials. In 1958, the Lindsay Light and Chemical Company merged into the American Potash & Chemical Company, and in 1967, as part of a larger corporate merger, the Kerr-McGee Chemical Corporation ("Kerr-McGee") acquired the facility. Kerr-McGee maintained operations at the facility until its closure in 1973. When it

was operating, the facility reportedly was the largest producer of rare earth and thorium compounds in the world.

Production of thorium, a radioactive material, yielded radioactive mill tailings primarily containing thorium and residual levels of radium and some uranium. These tailings were stockpiled at the REF, and during the early years of operation of the REF (from the 1930's through at least the 1950's), were available for use as fill material at residential and other properties throughout the area. The tailings were also used as fill or disposed of at RKP and the Sewage Treatment Plant. In 1954, thorium production became subject to federal regulation with the passage of the Atomic Energy Act ("AEA"), implemented by the U.S. Atomic Energy Commission ("AEC"). A license to operate the REF was granted in 1956 to Lindsay Light and Chemical Company and subsequently transferred with REF ownership to Kerr-McGee via its acquisition of American Potash in 1967. In 1974, under the Energy Reorganization Act, the AEC was abolished and its licensing and regulatory authority was transferred to the U.S. Nuclear Regulatory Commission ("NRC"). The State of Illinois petitioned the NRC for amendment of the agreement-state licensing program to include licensing control of REF material (categorized as 11(e)(2) by-product material as defined by the Atomic Energy Act), and IDNS was granted licensing authority on November 1, 1990.

Evidence indicates that thorium mill tailings were disposed at RKP along with other solid wastes, although available records do not indicate specific sources nor volume of wastes disposed at the site. Exact dates of thorium mill tailing disposal operations are not well known, but are generally thought to predate the passage of the AEA in 1954. Waste disposal operations were conducted at the RKP Site from at least 1939 to 1967, but were completed prior to 1974, based on observations made with aerial photographs.

Various studies and investigations have been conducted by different entities including: the Department of Energy, the NRC, the EPA, the State of Illinois, the City of West Chicago, and Kerr-McGee in an effort to identify the areas of contamination in and around the City of West Chicago and risks associated with exposure to the contamination.

The initial base study to identify and briefly characterize contaminated areas outside the REF was conducted from March 1976 to May 1978 by Argonne National Laboratory ("ANL") for the NRC. This study, conducted by Frigerio et al., identified 77 thorium-processing waste deposits in the area (the main body of the report identified areas located in and around the City of West Chicago, including RKP) which had thorium residual contamination. Techniques used to delineate the contaminated areas included an Aerial Radiological Monitoring Survey ("ARMS") flyover in 1977, a street-by-street instrumented vehicle survey, an external gamma exposure rate survey, soil contamination measurements using subsurface sampling, and a radiological walkover survey along the waterways and banks of Kress Creek and parts of the West Branch of the DuPage River. (The report of this study, entitled "Thorium Residuals in West Chicago, Illinois," is included in the Administrative Record, the index of which is

attached to this Action Memo as Attachment 1.) This report identified contaminated areas in RKP to be primarily located in and around the quarry and tennis courts.

During 1976, the RKP was briefly closed to allow a radiological survey of the area, and material was excavated from near the tennis courts and deposited in the primary waste area of the landfill. A security fence was installed around the primary waste area in early 1977. The purpose of the fence was to limit access to areas creating exposures above one-tenth of the NRC unrestricted access criterion of 2.0 mrad/hr (that is the fence was placed to control access to wastes which result in exposure rates in excess or 0.2 mrad/hr).

In 1982, Radiation Management Corporation ("RMC") completed a radiological survey for the NRC. This survey found radiological contamination predominantly inside the fenced area. Two areas identified by this survey (Booth et al., 1982) outside the fenced area included a strip directly north of the security fence and a small deposit at the southern end of the tennis courts.

In October 1984, EPA proposed four sites in the West Chicago area for placement on the NPL, including the RKP Site.

In 1991, a limited site investigation for the West Chicago Park District was conducted by Versar Inc. in an area north and east of the waste area where the Family Aquatic Center swimming pool had been proposed (Versar, 1991). Additional surface radiological contamination and buried waste material were found as a result of that work. This investigation identified four additional areas: a strip directly west of the old swimming pool, an area further west from the old pool location at the site of a former pond, an area near an old bandstand, and an area at the west end of National Street. The total volume of contaminated materials within the latter four areas was estimated to be approximately 250 yd^3 (Versar, 1991).

In the early spring of 1993, CH2M Hill initiated fieldwork for a Remedial Investigation (RI) under contract to EPA. The RI study included radiological walkover surveys of all known and suspected contaminated areas, surface soil, soil boring, vegetation, and ground water samples. The results of this study have not yet been finalized. However, preliminary results appear to confirm the findings of earlier studies.

Most of the radiological contamination in the landfilled quarry is located within the fenced security area, although some contamination extends approximately 20 ft west of the fenced area. Measured surface radiation exposure rates within the fence have been as high as 1,600 μR/hr (Booth et al., 1982). Based on subsurface radiological data, the contamination is in a layer ranging in thickness from approximately 3 to 8 ft, and occurring at depths up to 14ft below land surface.

Based upon preliminary information, EPA estimates that approximately 22,000 to 29,000 yd^3s of radioactive waste are present in the park (see Attachment 4). Evidence indicates that a liner is not present beneath the waste nor a cover over the waste. The fenced area is heavily vegetated and is posted with radiation warning signs, but is not guarded and is often vandalized. Additionally, evidence indicates trespassers have been inside the fence area.

In August of 1990, the RKP Site was placed on the NPL. As described below, EPA remedial activities at the RKP Site are underway and will continue concurrently with the proposed removal action discussed in this Action Memo. After completion of the time-critical removal specified by this Action Memo, EPA will complete the RI/FS at the Site, and will then select a final remedy for the entire Site.

In September 1995, CH2M Hill, under contract to EPA, completed a preliminary streamlined risk evaluation based upon data collected during the RI fieldwork. This document is entitled Risk Assessment Technical Memorandum ("RATM"). The assessment was focused, and includes only the human receptors and exposure pathways expected to be most significant. Three scenarios were evaluated, including a current receptor and two plausible future receptors. Risk evaluations were limited to potential effects resulting from exposure to radiological parameters and excluded consideration of ecological impacts as well as estimated risks resulting from potential exposure to possible chemical contaminants, including the chemical toxicity of radionuclides.

The soil sampling results indicated a median concentration of 286 picoCuries per gram ("pCi/g") of total radium and ranged as high as just over 15,000 pCi/g. In general, radium-228 ("Ra-228") was present at substantially higher concentrations than radium-226 ("Ra-226"). Ra-228 was generally present in the range of 5 to 10 times that of the concentrations of Ra-226. The RATM determined exposure point concentrations for radionuclides in soil from the 1,198 records of gamma walk-over survey data from the fenced area, or enclosure, collected during the RI fieldwork. The gamma levels (in counts per minute) were converted to estimates of total radium concentration in soils using the correlation developed for the Residential Areas removal. The use of the gamma count to total radium concentration (in pCi/g) conversion developed from the Residential Areas Site is not inappropriate because the contamination attributable to thorium mill tailings derives from the same source (the REF). The conversion is, however, limited to estimates of total radium and cannot be used to estimate the individual constituents of total radium, Ra-228 and Ra-226.

Based on this conversion, the median total radium concentration of surface soils in the enclosure is 134 pCi/g, with a 95th percentile concentration of 5,067 pCi/g. These values are in reasonable agreement with the results of the soil sampling where the median was 286 pCi/g. The small sample size of soil samples resulted in the 95th percentile total radium concentration coinciding with the maximum measured value of 15,132 pCi/g.

Anecdotal evidence, including visual sightings and discarded artifacts, indicates that juveniles occasionally enter the enclosure. Documented sightings have occurred at separate times, suggesting that the clearly posted warnings and continuous chain-link fencing may serve to attract intruders. Given the relatively large radiation exposure rates and soil radionuclide concentrations found within the enclosure, as compared to levels found over the balance of the park, the unauthorized intruder inside the enclosure was assumed to represent the population with the largest probable current exposure. The RATM estimated the median annual dose to an intruder into the fenced area to be 5.4 mrem/yr and the reasonable maximum exposure ("RME") dose to be 200 mrem/yr. The RME dose calculated for the current intruder scenario significantly exceeds the current radiation protection guidelines of 100 mrem/yr for non-occupational exposures. The risks to intruders in the fenced area were determined to be above what EPA generally considers to be a minimally acceptable risk. Additionally, future scenarios, evaluated for recreational and residential use assuming the fence is not maintained in perpetuity, generated risks which were significantly above minimally acceptable levels.

IDNS has been working cooperatively with EPA during the planning and implementation of remedial activities at the four West Chicago NPL sites. IDNS has been conducting the verification activities for EPA at the Residential Areas Removal Site to ensure that the cleanups are done in accordance with the established cleanup criteria. It is expected that IDNS will assume the same role for the removal at the RKP Site. EPA anticipates that the actual removal action will be implemented by the PRPs.

In conjunction with the Fund-lead remedial activities which are underway, EPA has been conducting and will continue to conduct community relations activities to keep the community informed about the Site and involved in the decision-making process. A Community Relations Plan has been prepared and is included in the Administrative Record.

The materials of concern at the Site are thorium mill tailings which contain radionuclides such as thorium, uranium and radium, and heavy metals such as lead, barium and chromium. All of these are hazardous substances as defined by Section 101(14) of CERCLA. Access to the hazardous substances existing on the RKP Site is not currently significantly restricted to prevent unacceptable exposures. Also, due to the nature of the contaminants (e.g., radionuclides), it would be difficult and impractical to maintain restricted access in perpetuity as needed to prevent unacceptable exposures. As a result, the primary routes of exposure include direct exposure to gamma radiation from contaminated soil, incidental ingestion of contaminated soil, inhalation of radon/thoron decay products, and direct contact with skin.

Currently, uranium contamination of ground water in the vicinity of the enclosure has been documented to be present at levels exceeding drinking water standards. Therefore, it is clear that the ground water is being impacted from the radioactive contamination present in the landfilled areas. There is no known current exposure to the contaminated ground water. However, potential future exposure to contaminated ground water is a significant long-term concern.

Potential contaminant migration is a concern. As a result of the most significantly contaminated soil being present at or near the ground surface, wind, erosion or deliberate human movement could cause the hazardous substances to migrate. Additionally, it has been documented that uranium contaminants have migrated from the wastes into the water table aquifer and are moving toward the site boundaries.

The results of samples taken for chemical analysis during the RI do not indicate significant chemical contamination and therefore chemical contaminants are not currently considered for cleanup during this removal. However, since the site was a landfill from the early 1930's to the early 1970's and there are no available records, it is unknown if chemical contamination will be encountered during the removal of the radioactive contamination.

As mentioned earlier, the volume of contaminated soil to be removed is currently estimated as between 22,000 and 29,000 yds^3. However due to historical landfilling activities at the RKP Site, the volume may change significantly during remediation. Actual costs may vary widely depending on the type of landfill debris encountered during the excavation. (Volume and cost estimates are described in Section V.B. of this Action Memo.)

B). Other Relevant Actions

Actions being taken to address thorium mill tailings contamination at other Kerr-McGee sites in West Chicago are relevant to this action. Remedial Investigations have commenced at all four NPL sites. Additionally, Kerr-McGee has been conducting closure activities at the REF as required by IDNS pursuant to the Illinois Radiation Protection Act. Under the license, Kerr-McGee is required to excavate and transport to a permanent disposal facility all radioactive contaminated materials which exceed the standard of 5 pCi/g above background of total radium at any depths. For this closure activity, Kerr-McGee may be required to excavate to depths of up to 20-25 feet below ground surface. It is intended that the closure activities will allow for unrestricted use of the REF property in the future.

A few of the relevant actions taken at the Residential Areas NPL Site include:

> In November 1993, EPA finalized the Action Criteria for the Residential Areas NPL Site. These criteria, contained in the document "Action Criteria for Superfund Removal Actions at the Kerr-McGee Residential Areas Site, West Chicago, Illinois," ("AC for RAS") are being used for the discovery and characterization of contaminated properties, and for verification activities during and after the removal of contaminated materials. This document specifies a primary criterion of 5 pCi/g dry soil concentrations above background of total radium (Ra-228 plus Ra-226). Additionally, use of the concept of "ALARA" (As Low As Reasonably Achievable) was utilized for the residential cleanups.

In August of 1994, EPA finalized an Engineering Evaluation/Cost Analysis ("EE/CA") to support the efforts of a Non-Time-Critical Removal Action at the Residential Areas Site. The EE/CA identified potential alternatives for remediating residential properties contaminated with thorium mill tailings. In this document, EPA concluded that there were no proven and effective treatment technologies for radioactively contaminated soils. Since containment was not considered a viable option, the EE/CA evaluated two basic alternatives: 1) No action; and 2) Excavation and permanent disposal. The EE/CA also discusses the application of the ALARA concept as well as compliance with Applicable or Relevant and Appropriate Requirements ("ARARs"). For the two remedies evaluated, the EE/CA also provided a range of estimated costs for each of the alternatives based upon various volumes of contamination to be addressed.

On November 18, 1994, EPA issued an Action Memorandum for the RAS specifying a Non-Time-Critical Removal Action consisting of excavating radiologically contaminated soils for permanent disposal at a licensed facility. Because a permanent disposal facility was not available, a planning period in excees of six months existed and allowed this action to be implemented as a Non-Time-Critical Removal Action. The central clean-up level specified was 5 pCi/g in dry soil above background for total radium, or 7.2 pCi/g total radium based upon subsequent background sampling.

In April of 1995, EPA finalized the Decision Rule Development and Application Technical Memorandum for use at the Residential Areas Site. These efforts produced a correlation between counts per minute gamma measurements and total radium concentrations in surface soils. This correlation allowed for real-time characterization of potentially contaminated properties. Additionally, this document specified background levels of total radium (Ra-226 plus Ra-228) at approximately 2.2 pCi/g and also determined that heavy metal contamination was not present at the Residential Areas Site at levels of concern.

C). Proposed Cleanup Criteria

Under Superfund, long-term remedial actions must attain Federal and more stringent State ARARs during and at the completion of the remedial action. Removal actions (such as the type being planned at the RKP Site) must attain ARARs to the extent practicable. Other relevant actions, policies, or guidances, may also be used as To-Be-Considered ("TBC") criteria when evaluating cleanup decisions. Therefore, EPA relied upon Federal and State ARARs to the extent practicable, as well as, TBC criteria such as consistency with other similar actions being conducted at the REF and the Residential Areas Site.

There are no established regulatory requirements which are directly applicable to establishing cleanup criteria for this proposed removal action. However, the most significant requirements which are relevant and appropriate, at least in part, to establishing cleanup criteria are those present in federal and state regulations for uranium and thorium mill tailings sites. These

regulations are found in Title 40, Part 192 of the Code of Federal Regulations (40 CFR 192), entitled "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings" and the associated State regulations of Title 32, Chapter II, Subchapter b, Part 332 of the Illinois Administrative Code, entitled "Licensing Requirements for Source Material Milling Facilities," which were based on the federal standards.

The State standards are considered more stringent than the federal standards due to a dry weight measurement requirement and, therefore, are considered to be the ARAR for this site. These standards state:

> Concentrations of radionuclides in soil above background concentrations for total radium, averaged over areas 100 square meters, shall not exceed:
>
> A) 5 picocuries per gram of dry soil, averaged over the first 15 centimeters below the surface; and
>
> B) 15 picocuries per gram of dry soil, averaged over layers of 15 centimeters thickness more than 15 centimeters below the surface. (Title 32, IAC, Ch.II, Sbch b, Pt 332)

An additional ARAR of significance for cleaning up radioactive contaminated sites is the requirement of ALARA. This requirement can be found in: DOE Order 5400.5, entitled "Radiation Protection of the Public and the Environment"; Nuclear Regulatory Regulations found in Title 10, Part 20 of the Code of Federal Regulations (10 CFR 20), entitled "Standards for Protection Against Radiation"; and, the U.S. Nuclear Regulatory Commission's Regulatory Guide 8.37. ALARA is considered as a TBC criterion for this proposed removal.

Detailed discussion of these ARARs, as well as others, can be found in the AC for RAS. In the AC for the RAS, EPA determined that the 15 pCi/g standard was not health based, but more of a standard established as a practical measurement tool which assumed that this criteria would result in essentially the same degree of cleanup at DOE sites as originally proposed under the 5 pCi/g standard.

The Residential Areas Site Removal utilized, among other criteria, the criteria of 5 pCi/g of dry soil as well as the concept of ALARA for the cleanup of radioactive contaminated soils. Additionally, Kerr-McGee is implementing closure activities at the REF under a license from IDNS. This license also utilizes the criteria of 5 pCi/g of dry soil and the concept of ALARA to minimize the amount of residual soil contamination between 5 pCi/g and 15 pCi/g left at the REF after closure activities are completed. As a result of the cleanup criteria for closure activities at the REF, excavations at depths exceeding 20 feet will be required and allow the REF site to be released for unrestricted use.

EPA is selecting the cleanup criterion of 5 pCi/g of dry soil along with the concept of ALARA as the cleanup criteria for this proposed removal at the RKP Site. These criteria would allow the cleanup of the RKP Site to comply with State and Federal ARARs to the extent practicable and be consistent with other similarly contaminated site cleanups being conducted at the Residential Areas Site and the REF within the West Chicago area. These criteria would allow the RKP Site to be released for unrestricted use as it relates to radioactive contamination in soils and would contribute to the long-term effectiveness and permanence of the evennual remedy. Considering the current and potential future land uses, cleanup of the RKP Site to less restrictive criteria would not provide adequate long-term protection of public health and the environment.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Conditions at the RKP Site currently exist which may present an imminent and substantial endangerment to public health or welfare or the environment. The conditions at the RKP Site meet the criteria for a removal action as set forth in the NCP, Section 300.415(b)(2), specifically:

A) Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby human populations, animals or the food chain.

This factor is present at the RKP Site because of the existence of thorium mill tailings in the soils, at or near the surface, of the enclosed fence area as well as other unrestricted areas within the park. The thorium mill tailings contain radionuclides such as thorium, uranium and radium, and heavy metals such as lead, barium and chromium, all of which are hazardous substances as defined by Section 101(14) of CERCLA. Nearby human populations and animals may be exposed to the hazardous substances by the following routes of exposure:

1) Direct gamma exposure resulting from radioactive decay of radionuclides contained in contaminated soils;

2) Incidental ingestion of contaminated soil;

3) Inhalation of radon and thoron decay products within fence area emanating from highly contaminated soil present at the surface;

4) Dermal exposure to beta emitters from direct contact of skin with contaminated soils; and

5) Inhalation of radioactive particulates resulting from disturbance of contaminated soil.

EPA believes that the presence of any additional hazardous substances, such as heavy metals (lead, barium and chromium), is due to the presence of the mill tailings and that excavation of the mill tailings to the cleanup standards for radionuclides described in Section II of this Action Memo will adequately mitigate any risk presented by these metals. EPA currently is investigating whether such metals are also present at levels of concern.

The thorium mill tailings at the RKP Site emit ionizing radiation. Exposure to ionizing radiation can cause carcinogenic, genetic and teratogenic effects. For this Site, the potential for cancer induction in exposed individuals is considered to be the greatest health concern. Ionizing radiation is a demonstrated human and animal carcinogen, based on data that correlates high exposures of radiation to cancer induction. Although significant uncertainty exists from extrapolating high-level information to low-level effects, current radiation protection standards are based on the idea that each increment of radiation exposure causes a linear increase in the risk of cancer.

In addition to hazards from exposure to radiological emission products, uranium is chemically toxic to the kidneys.

Lead is the most common toxic metal in the environment, and there are many effects from chronic exposure to low levels, ranging from anemia to impairment of the nervous, hematopoietic and cardiovascular systems. The effects of exposure to barium can include paralysis, cardiovascular abnormalities and gastroenteritis. Chronic ingestion of hexavalent chromium can cause kidney damage, while chronic inhalation can cause lung cancer.

The Illinois Department of Public Health, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry, conducted a Public Health Assessment for the "Kerr-McGee Radiation Areas." The Public Health Assessment (included in the Administrative Record; see index, Attachment 1) stated that although the health outcome data that has been evaluated indicated increases in certain cancers in the community and workers at the REF, the studies were inconclusive with respect to identifying the Kerr-McGee wastes as the cause of the cancers.

The Public Health Assessment concluded that the conditions at the West Chicago Radiation Areas, including the RKP site, "are a public health hazard because of the risk to human health resulting from past, present and/or potential future exposure to radioactive and nonradioactive substances at concentrations that may result in adverse health effects."

B) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate.

This factor is present at the RKP Site due to the existence of thorium mill tailings in surface and near subsurface soils that may migrate due to wind. erosion, or deliberate human movement.

EPA has determined background concentrations of total radium concentrations for the Residential Areas Site to be 2.2 pCi/g. EPA believes this background level would be representative of background levels at RKP. The results of the gamma walkover scans indicate that the total radium concentration of surface soils in the enclosure is 134 pCi/g, with a 95th percentile concentration of 5,067 pCi/g. The results of the soil sampling indicate that the median total radium concentration is 286 pCi/g and the 95th percentile total radium concentration is 15,132 pCi/g. In fact, the highest concentrations, including the sample with total concentrations of 15,132 pCi/g of total radium, were found in two separate surface soil samples and are subject to wind erosion. As previously discussed, these concentrations produce a reasonable maximum exposure dose of 200 mrem/yr when evaluating the current exposure scenario for an intruder into the enclosed fenced area. This dose significantly exceeds the current radiation protection regulation of 100 mrem/yr for non-occupational exposures found in the NRC regulations of 10 CFR 20.

Radon-222 (commonly known as radon) and radon-220 (commonly known as thoron) are the gaseous decay products of uranium and thorium, respectively. The decay products of radon and thoron can, in turn, result in radiation doses to the lungs. As a result of mill tailings at extreme concentrations at the surface, radon and thoron decay products can be generated at unacceptable levels within the fence enclosure. These decay products may also migrate past the fenceline which can result in unacceptable exposures to the general public.

C) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

This factor is present at the RKP Site due to the existence of very high concentrations of thorium mill tailings in surface and near subsurface soils that may migrate due to wind or erosion. Such migration may occur if there are contaminated areas without a good vegetative cover or if there are contaminated areas that have been disturbed by human activities.

IV. ENDANGERMENT DETERMINATION

The current Site conditions include radioactive hazardous substances located at or near the surface at levels which produce unacceptable exposures to possible intruders into the fence area. The actual or potential exposure pathways to nearby populations described in Sections II and III above, and the actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may

present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

The following actions are proposed to mitigate the imminent and substantial endangerment to human health or welfare or the environment posed by contaminated soils at the Site:

a) Soil sampling to further delineate areas above cleanup criteria of 5 pCi/g total radium (Ra-226 plus Ra-228) above background or 7.2 pCi/g total radium (background conditions are 2.2 pCi/g total radium).

b) Excavate radioactive contaminated materials from the RKP Site (including the fenced area, as well as other areas identified throughout the park) found to exceed EPA's discovery and characterization criteria as defined for the Residential Areas Site until levels at or below the verification criteria are reached, including implementing the ALARA principle (see action criteria document).

c) Provide additional measures (e.g., institutional controls) for those limited and exceptional situations that may occur where complete excavation of contaminated materials cannot be reasonably accomplished and such measures are needed to reduce exposures and associated risks.

d) Minimize the potential health hazards to workers performing the removal action and to nearby residents during the removal action.

e) Consolidate landfill wastes left behind, as appropriate, and provide an adequate RCRA Subtitle D landfill cover over this material.

f) Backfill the excavated areas with clean soil and appropriately restore the excavated areas for recreational uses or to such other condition as may be arranged with the property owner.

g) Use appropriate environmental monitoring during and after removal to verify that cleanup levels are reached and short-term impacts (e.g. generation of dust during removal) are minimized.

h) After excavation, transport excavated contaminated materials removed from the RKP Site to an off-site disposal facility licensed to accept and dispose of 11(e)(2) byproduct material.

The response actions described in this memorandum directly address actual or threatened releases of hazardous substances at the RKP Site which may pose an imminent and substantial endangerment to public health and safety, and to the environment. The response action will comply with the Off-Site Rule (58 F.R. 49200, September 22, 1993). The appropriate State officials in the receiving State will be notified, prior to actual shipment of wastes, that wastes from the RKP Site will be shipped to a disposal area in that State as part of this response action.

Currently, EPA anticipates that the removal action will be implemented by the PRPs. The PRPs may use the REF, subject to approval by IDNS, as a staging area for the wastes, which then would be shipped by rail to a permanent disposal site in Utah (Envirocare), or any other appropriately permitted disposal site, concurrent with other wastes from the REF. In the unlikely event that transportation of the wastes to the permanent disposal facility is delayed, interim storage of the wastes at the REF would be allowed by EPA, subject to any necessary State or local approvals.

EPA evaluated a number of possible response actions for the Residential Areas Site in the Engineering Evaluation/Cost Analysis, and determined that excavation of the contaminated soils and off-site disposal (the alternative recommended) was the only feasible long-term solution for mitigating the threats posed by the Site. EPA has determined that this evaluation is also appropriate to the RKP Site. Excavation permanently segregates the contaminated soils from the public and is, therefore, effective at reducing exposure to nearby populations. Excavation technology using standard construction procedures and conventional equipment has been successfully applied at similarly contaminated sites and landfills throughout the United States.

Although excavation of contaminated soils is the primary component of the removal action, situations may be encountered where complete excavation cannot be accomplished and additional measures are needed to reduce exposures and associated risks. In such limited and exceptional situations, it may be necessary to provide additional measures such as institutional controls.

EPA must continue its RI/FS activities in order to fully characterize the extent of the contamination (i.e., specifically as it relates to the potential chemical contamination) at the Site and to document conditions after the removal specified in this memo is completed. However, commencement of the removal action need not wait until characterization of the entire Site is completed, but should begin as soon as possible (weather permitting) on the areas that already have been identified as contaminated.

EPA has commited to the community to expedite all of the cleanups of the Kerr-McGee Superfund sites to the extent possible so the cleanups can be completed before the closing date of September 1998 for the REF. This would allow all of the cleanups to be conducted efficiently by utilizing the REF as a trans-shipment facility. As a result, cleanups must begin as soon as possible. EPA has determined that a 6-month planning period is not feasible because: (1) a full construction season is likely to be lost; and (2) EPA has conducted the functional equivelent of an EE/CA by applying the lessons learned through the implementation of the RAS removal action and utilizing much of the same information contained in the EE/CA developed for the RAS site. Cleanup of the RKP Site will be implemented as a time-critical removal because of site conditions and the lack of a planning period of at least six months as specified in the NCP for conducting a non-time-critical removal. EPA has notified the State and local authorities, members of the Thorium Action Group (an environmental community action group), and the PRPs of this approach.

2. Contribution to Remedial Performance

The proposed removal action will contribute to the efficient performance of the long-term remedial action for the RKP NPL Site. The proposed action is consistent with the concept of the Superfund Accelerated Cleanup Model, which encourages taking early actions at sites to promptly reduce risks.

EPA will continue to collect additional data on the nature and extent of contamination as it continues with the RI/FS process. Additionally, verification data collected during and after excavation of contaminated soils will be evaluated to assess the conditions of the post-removal Site (i.e., amount of residual materials remaining after removal and risks from such residuals). All such data will be incorporated into a RI/FS for the Site. At some point during this process, EPA will write a ROD documenting the decision on the final remedial action for the Site. It is expected that the removal of the contaminated source material will mitigate the threat currently posed by this site. Long-term maintenance of the landfill cap and future ground water monitoring may be appropriate for the evaluation of the long-term effectiveness of the removal.

3. Description of Alternative Technologies

Alternative treatment technologies were considered in the EE/CA for the Residential Areas Site, but were not proposed. As discussed in detail in the EE/CA, the physical and chemical treatment technologies available did not pass the initial screening of alternatives because they were judged not to be effective for the radioactively contaminated soils from the Residential Areas Site. Since the contaminated materials at the RKP Site are considered essentially the same as the materials at the Residential Areas Site and are radioactively contaminated, treatment technologies would also not be effective for the contamination present at RKP.

4. Applicable or Relevant and Appropriate Requirements ("ARARs")

For all on-Site activities during the removal action, compliance with the cleanup criteria for this Site is deemed to be compliance with all federal and state ARARs related to cleanup levels of radioactive contamination. The cleanup criteria will be complied with during the removal action to the maximum extent practicable considering the exigencies of the situation. Other federal and state ARARs have been discussed in Appendix B of the EE/CA for the Residential Areas Site and address other aspects of the removal action. These ARARs will also be complied with to the extent practicable considering the exigencies of the situation at the RKP Site.

6. Project Schedule

The length of time needed to carry out the removal action is unknown at this time due to the possible complexity of excavating historic landfill waste. Materials handling capability is likely to control the speed of the cleanup. It is estimated that the excavation of radioactive contaminated material from the landfill will take at least one full construction season.

If, as EPA anticipates, the PRPs implement the removal action, the PRPs would submit a Removal Action Work Plan and other associated documents which detail how the removal will be conducted. Excavation can begin after the Work Plan is approved by EPA. Excavation work will probably not begin until late Spring or early Summer of 1996 at the earliest. EPA currently expects that the removal work would continue through the end of the 1996 construction season and extend into the 1997 construction season.

B. Estimated Costs

EPA anticipates that this removal action will be conducted by the PRPs. The following cost estimates are provided for informational purposes only.

The costs for the removal action at this Site will be directly dependent on the extent of contamination (volume of material to be removed), and the volume and type of waste which needs to be handled to excavate the radioactive contaminated material. However, cost information developed and presented in the Residential Areas Site EE/CA can be used as a guide for estimating the costs for this removal action. Cost estimates provided in the EE/CA estimated total removal costs to be approximately $1290/yd^3$ for excavating and disposing of residential soils. Although not directly applicable, it is believed that these costs provide a reasonable estimate of likely costs for the removal at the RKP Site. Using these unit costs, excavating and disposing of up to 29,000 cu yds of contaminated materials from the RKP site would result in an

estimate of approximately $ 37,410,000. However, these cost were generated assuming EPA would conduct the removal and material would be placed in bags and a trans-shipment facility would need to be located. If the PRPs conduct the removal action, materials would likely be handled in bulk and the REF would be utilized as a trans-shipment facility, both of which would reduce actual costs.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If action is delayed or not taken, public health risks to intruders into the fenced area of the Site and the population which utilize the park for recreation will increase due to prolonged exposure to direct gamma radiation, incidental ingestion of contaminated soil, inhalation of radon and thoron decay products, and direct contact with contaminated soils.

VII. OUTSTANDING POLICY ISSUES

None.

VIII. ENFORCEMENT

For administrative purposes, information concerning confidential enforcement strategy for this site is contained in the Enforcement Confidential Addendum.

IX. RECOMMENDATION

This decision document represents the selected removal action for the Kerr-McGee Reed-Keppler Park Site in DuPage County, Illinois, developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on the Administrative Record for the Site. Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed removal action. Please indicate your decision by signing below.

APPROVED: _____ DATE: 3/27/96.
Regional Administrator

DISAPPROVED: _____ DATE: _____
Regional Administrator

Enforcement Confidential Addendum

Attachments

1. Index to Administrative Record
2. Site LocationMap
3. Site Map

cc: Terri Johnson, EPA HQ, 5202G
Don Henne, U.S. Department of the Interior
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Illinois Department of Nuclear Safety
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BCC SECTION

REDACTED

NOT RELEVANT TO THE SELECTION OF REMOVAL ACTION

Original: Kerr-McGee Reed-Keppler Park Site File

KERR-MCGEE REED-KEPPLER PARK SITE

ENFORCEMENT ADDENDUM

REDACTED

NOT RELEVANT TO THE SELECTION OF REMOVAL ACTION

ATTACHMENT 1

AR

U.S. EPA ADMINISTRATIVE RECORD
REMOVAL ACTION

KERR-MCGEE/REED-KEPPLER PARK SITE
WEST CHICAGO, ILLINOIS

ORIGINAL
MARCH 27, 1996

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	07/15/76	Hubert, C., West Chicago Park District	City of West Chicago	Letter re: Radiation Hazards at the Kerr-McGee/Reed Keppler Park Site	1
2	06/30/77	Rennels, A., City of West Chicago	Peterson, P., Illinois Department of Public Health	Letter re: Radioactive Contaminated Waste at Kerr-McGee/Keppler Park Site	1
3	06/03/83	Street, K., U.S. EPA	U.S. EPA	Site Inspection Report for the Kerr-McGee/Reed-Keppler Park Site	14
4	10/00/83	U.S. EPA/ EMSL	U.S. EPA	Aerial Photographic Analysis of Waste Disposal Site in West Chicago	40
5	03/27/84	Constantelos, B., U.S. EPA	Rainey, J., Kerr-McGee Chemical Corporation	Letter re: Kerr-McGee Radiation Sites (Non-Licensed Areas)	5
6	05/17/84	Hedglon , M., Kerr-McGee	Neuberger, B., U.S. EPA	Letter Forwarding Attached Documents re: Kerr-McGee's Partial Response to U.S. EPA's Information Request	112
7	05/17/84	Rennels, A., City of West Chicago	Constantelos, B., U.S. EPA	Letter re: Mayor's Response to U.S. EPA's March 27, 1984 Letter Concerning the Kerr-McGee Radiation Sites (Non Licensed Areas)	3
8	06/08/84	Hedglon, M., Kerr-McGee Corporation	Neuberger, B., U.S. EPA	Letter Forwarding Attached List of Documents in Response to U.S. EPA's CERCLA Request	13
9	02/28/85	Kerr-McGee Chemical Corporation	Constantelos, B., U.S. EPA	Letter re: U.S. EPA's Request Concerning Kerr-McGee's Survey and Excavation Work in Off-Site Areas of West Chicago	7
10	06/12/85	Denny, I., Kerr-McGee Chemical Corporation	Constantelos, B., U.S. EPA	Letter re: Kerr-McGee's Survey and Excavation Work in Off-Site Areas of West Chicago	119

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
11	09/00/85	Kerr-McGee Chemical Corporation	U.S. EPA	Report: Thorium Removal Program for Reed-Keppler Park and Sewage Treatment Plant	264
12	09/26/85	Applied Science Laboratory, Inc.	U.S. EPA	Report on Radiological Surveys Results and Volume Estimates for the City of West Chicago Sewage Treatment Plant and Reed-Keppler Park	133
13	02/23/89	U.S. EPA	Public	Index to the U.S. EPA Administrative Record for the Kerr-McGee Sites [1 Microfiche Volume] (DOCUMENTS CONTAINED IN THE INDEX ARE INCORPORATED BY REFERENCE)	26
14	05/00/99	Street, K., U.S. EPA	U.S. EPA	NPL Status (May 1990) w/Attached June 1, 1983 Hazardous Ranking Scoring Package	20
15	05/21/90	U.S. EPA	U.S. NRC Atomic Safety and Licensing Appeal Board	Amicus Curiae Brief of the U.S. EPA re: Kerr-McGee Chemical Corporation (West Chicago Rare Earths Facility)	17
16	06/05/90	Ullrich, D., U.S. EPA	Stauter, J., Kerr-McGee Chemical Corporation	Letter re: Request for Information Pursuant to Section 104 (e) of CERCLA and Section 3007 of RCRA for the Former Rare Earths Facility and Associated Kerr-McGee Sites (UNSIGNED)	
17	07/05/90	Stauter, J., Kerr-McGee Chemical Corporation	Schafer, G., U.S. EPA	Letter Forwarding Attached Kerr-McGee Response to U.S. EPA's 104 (e) Information Request	26
18	08/01/90	Muno, W., U.S. EPA	Mayka, J., U.S. EPA	Memorandum re: Kerr-McGee Sites Information Request	1
19	09/24/90	Swanson, S., U.S. EPA	Mayka, J., U.S. EPA	Memorandum re: "Mixed Waste" Technical Review for the Kerr-McGee	5
20	04/19/91	Traub, J., U.S. EPA	Netzel, P., City of West Chicago	Letter re: Request for Information Pursuant to Section 104 (e) of CERCLA and Section 3007 of RCRA for the Kerr-McGee Sites (UNSIGNED)	13
21	05/17/91	Versar, Inc.	U.S. EPA	Remedial Investigation Feasibility Study Plan for the Reed-Keppler Park Proposed Family Aquatic Center	113

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23	09/06/91	Ullrich, D., U.S. EPA	Netzel, P., City of West Chicago	Letter re: Notification Pursuant to Section 122 (a) of CERCLA Avoidance of Inconsistent Response Action (UNSIGNED)	2
24	09/17/91	Rice, G., Kerr-McGee Chemical Corporation	Ullrich, D., U.S. EPA	Letter re: the Remedial Investigation and Feasibility Studies at the Four West Chicago Sites	4
25	09/30/91	Versar, Inc.	U.S. EPA	Remedial Investigation of Thorium Contamination at the Reed-Keppler Park Proposed Family Aquatic Center	115
26	10/00/91	U.S. EPA	Public	Fact Sheet: "Kerr-McGee Superfund Sites"	4
27	10/05/92	CH2M Hill	U.S. EPA	RI/FS Work Plan for the Kerr-McGee/Reed-Keppler Park Site	81
28	12/00/92	CH2M Hill	U.S. EPA	Health and Safety Plan for the Kerr-McGee/Reed-Keppler Park Site	41
29	12/00/92	CH2M Hill	U.S. EPA	Quality Assurance Project Plan for the Kerr-McGee Sewage Treatment Plant Site	374
30	00/00/93	CH2M Hill	U.S. EPA	Summary of Analytical and Validation Efforts for the Kerr-McGee/Reed-Keppler Park, Kress Creek, and Sewage Treatment Plant Superfund Sites	14
31	02/00/93	U.S. EPA	Public	Fact Sheet: "U.S. EPA Begins Studies at Reed-Keppler Park and Sewage Treatment Plant"	8
32	03/00/93	Jensen, L., U.S. EPA/ ORIA	U.S. EPA	Paper: "Mixed Waste: A Briefing Paper for Setting Residual Radioactivity Standards"	51
33	04/23/93	Meserve, R., Covington & Burlington	Oge, M., U.S. EPA	Letter re: U.S. EPA Region 5 Cleanup Standards for Mills Tailings	2
34	06/09/93	Meserve, R., Covington & Burlington	Frey, R., U.S. EPA	Letter re: State and Federal Standards Establishing Cleanup Criteria of 15 Pci/g Above Background for Buried Materials w/Attachment	15

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35	06/24/93	Allen, R., Illinois Department of Nuclear Safety	Jensen, L., U.S. EPA	FAX Transmittal re: West Chicago Background Data	7
36	12/23/93	Versar, Inc.	U.S. EPA	Reed-Keppler Park Family Aquatic Center Construction Monitoring and Contingency Plans	35
37	01/10/94	Seely, D., U.S. EPA	Thomas, D., West Chicago Park District	Letter re: U.S. EPA's Review of the December 23, 1993 Reed-Keppler Park Family Aquatic Center Construction Monitoring and Contingency Plans	2
38	03/15/94	Ortiger, T., Illinois Department of Nuclear Safety	Thomas, D., West Chicago Park District	Letter re: IDNS Review of the Final Monitoring and Contingency Plan for the Family Aquatic Center Construction Project	1
39	05/16/94	Klinger, J., Illinois Department of Nuclear Safety	Thompson, R., Kerr-McGee Chemical Corporation	Letter Forwarding Attached Amendment #20 to Kerr-McGee's License Number STA-583	15
40	05/19/94	State of Illinois/ Kerr-McGee Chemical Corporation	Parties to the Agreement	Agreement Between Kerr-McGee and the City of West Chicago re: Decommissioning and Cleanup of the Kerr-McGee Rare Earths Facility	9
41	05/24/94	Bunsen, S., Versar, Inc.	Thomas, D., West Chicago Park District	Letter Forwarding the Attached Photodocumentation for the Hotspot Covering Completed on May 17-18, 1994	8
42	07/12/94	Bunsen, S., Versar, Inc.	Seely, D., U.S. EPA	Letter Transmitting Attached Copies of Handwritten Logbook Pages	6
43	07/22/94	Bunsen, S., Versar, Inc.	Seely, D., U.S. EPA	Letter re: Versar's Request for a Minor Deviation from the U.S. EPA Approved Monitoring and Contingency Plan	1
44	08/10/94	Bunsen, S., Versar, Inc.	Seely, D., U.S. EPA	FAX Transmittal Forwarding Attached Waste Tracking Form	4
45	08/12/94	Versar, Inc.	U.S. EPA	Executive Summary: West Chicago Park District Family Aquatic Center Construction Monitoring and Contingency Plan Results	52

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46	08/30/94	Harris, W., U.S. EPA	Bowden, R., U.S. EPA	Memorandum re: Approval of the First Revision Fund- Lead QAPP Addendum for the RI/FS Activities at the Kerr-McGee Sewage Treatment Plant and the Reed-Keppler Park Sites w/Attached Signed QAPP Title Page	2
47	11/00/94	CH2M Hill	U.S. EPA	Revised Work Plan Revision Request #1 for the RI/FS for the Kerr-McGee/Reed-Keppler Park Site	21
48	11/14/94	IDPH; USDHHS/ USPHS/ATSDR	U.S. EPA	Public Health Assessment for the Kerr-McGee Radiation Areas	243
49	11/18/94	U.S. EPA	Public	Index to Thirty-Three Documents Contained in the U.S. EPA Administrative Record for the Kerr-McGee Residential Areas Removal Site [6v] (DOCUMENTS INCORPORATED BY REFERENCE)	3
50	12/01/94	Illinois Department of Nuclear Safety		Licensing Requirements for Source Material Milling Facilities (32 Illinois Administrative Code; Title 32: Energy; Chapter II: Department of Nuclear Safety; Subchapter b: Radiation Protection; Part 332) [Amended]	50
51	01/07/95	Turner, A., CH2M Hill	Seely, D., & R. Frey; U.S. EPA	Memorandum re: Mixed Waste Potential at the Kerr-McGee NPL Sites	29
52	02/00/95	CH2M Hill	U.S. EPA	1993 Chemical Data Summary for the West Chicago NPL Sites: Kress Creek, Reed-Keppler Park and Sewage Treatment Plant	89
53	02/24/95	Morin, C., Illinois EPA	Seely, D., U.S. EPA	Letter re: Applicability of State ARARs for Low Level Radioactive and Special/Hazardous Waste at the Kerr-McGee/Reed Keppler Park Site w/Attachments	3
54	03/00/95	CH2M Hill	U.S. EPA	Technical Memorandum: Decision Rule Development and Application for the Kerr-McGee Residential Areas Site	175
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56	06/06/95	Lakics, S., City of West Chicago	Franzen, G., DuPage County Board	Letter re: Mayor's Comments on Kerr-McGee's Letter of May 2, 1995	7
57	09/20/95	CH2M Hill	U.S. EPA	Monthly Progress Report: Receipt and Validation of Kerr-McGee NAREL Radiochemical Samples	35
58	09/25/95	Murphy, M., U.S. EPA	White, J.D., Kerr-McGee Chemical Corporation	Letter Forwarding Attached Validated NAREL Data for the Kerr-McGee/Reed-Keppler Park, Sewage Treatment Plant and Kress Creek Sites through September 19, 1995	37
59	09/26/95	Thomas, D., West Chicago Park District	Seely, D., U.S. EPA	Letter Forwarding Attached Intergovernmental Lease Agreement Between the City of West Chicago Park District	31
60	09/28/95	CH2M Hill	U.S. EPA	Risk Assessment Technical Memorandum for the Kerr-McGee/ Reed-Keppler Park Site	64
61	10/13/95	Richards, S., CH2M Hill	Turner, A., CH2M Hill	Memorandum re: Preliminary Comparison of RKP Data with Regulatory Standards for Chemicals	17
62	10/18/95	Seely, D., U.S. EPA	Morin, C., Illinois EPA	Letter re: U.S. EPA's Request for Identification of Potential Site ARARs	1
63	10/23/95	Morin, C., Illinois EPA	Seely, D., U.S. EPA	Letter re: Potential State ARARs	2
64	01/15/96	Seely, D., U.S. EPA	File	Memorandum re: IEPA's October 23, 1995 Letter Concerning the Potential Reed-Keppler Park Removal Action	4
65	01/26/96	USDHHS/USPHS/ ATSDR	U.S. EPA	FAX Transmission: ATSDR Record of Activity	2
66	02/14/96	Turner, A., CH2M Hill	Seely, D., U.S. EPA	Memorandum re: Reed-Keppler Park Site Risk Evaluations w/Attachments	21
67	03/27/96	Seely, D., U.S. EPA	Adamkus, V., U.S. EPA	Action Memorandum: Determination of Threat to Public Health or Welfare or the Environment at the Kerr-McGee Reed-Keppler Park Site	30

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U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
KERR-MCGEE REED KEPPLER PARK SITE
WEST CHICAGO, ILLINOIS

UPDATE #1
DECEMBER 3, 1999

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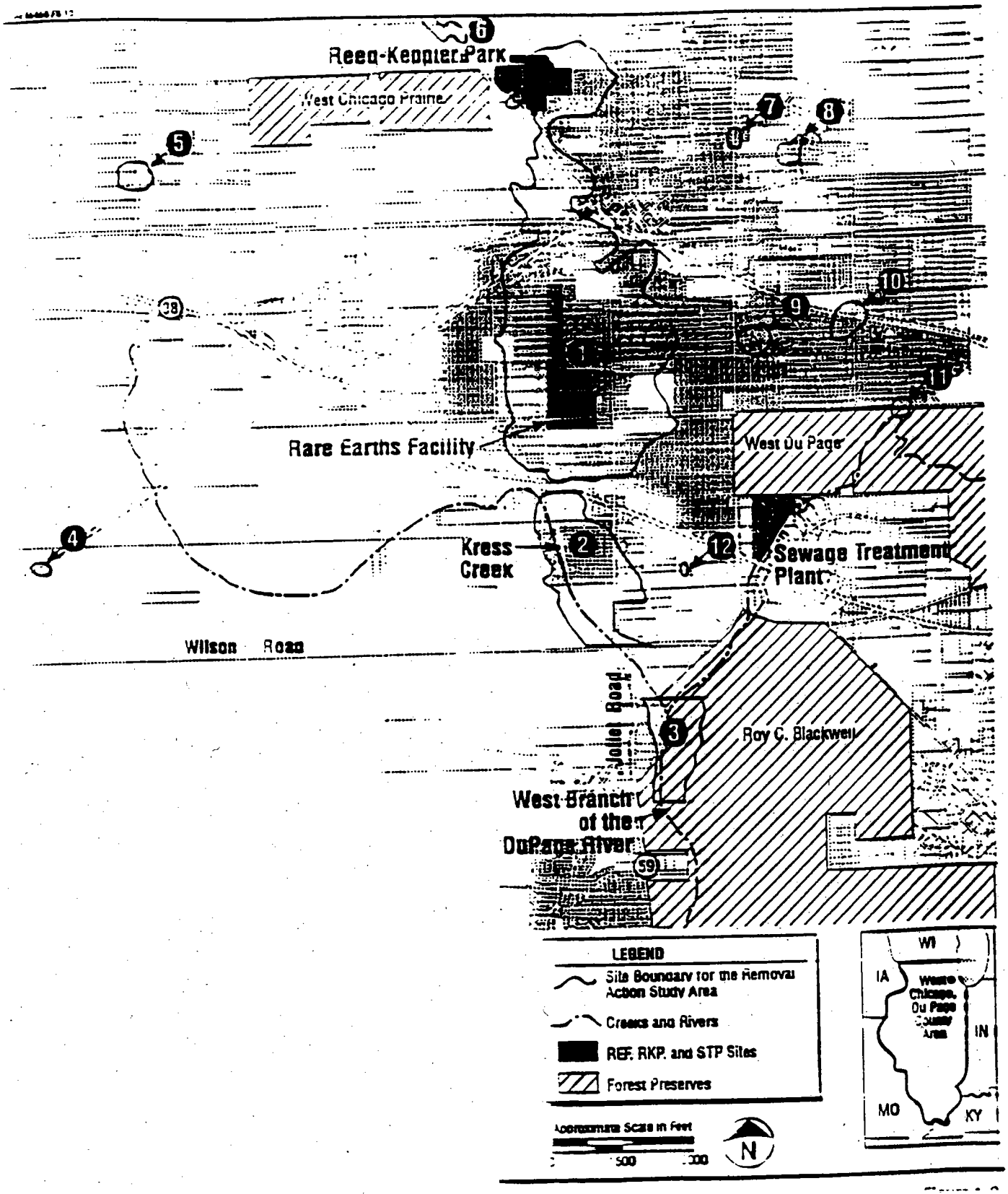
1	09/25/96	U.S. EPA	Respondents	Unilateral Administrative Order for the Kerr-McGee Reed Keppler Park Site	67

ATTACHMENT 2


Reed-Keppler Park
West Chicago Prairie
Rare Earths Facility
West Du Page
Kress Creek
Sewage Treatment Plant
Wilson Road
Joliet Road
Roy C. Blackwell
West Branch of the DuPage River
LEGEND
Site Boundary for the Removal Action Study Area
Creeks and Rivers
REF, RKP, and STP Sites
Forest Preserves
Approximate Scale in Feet
500
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ATTACHMENT 3

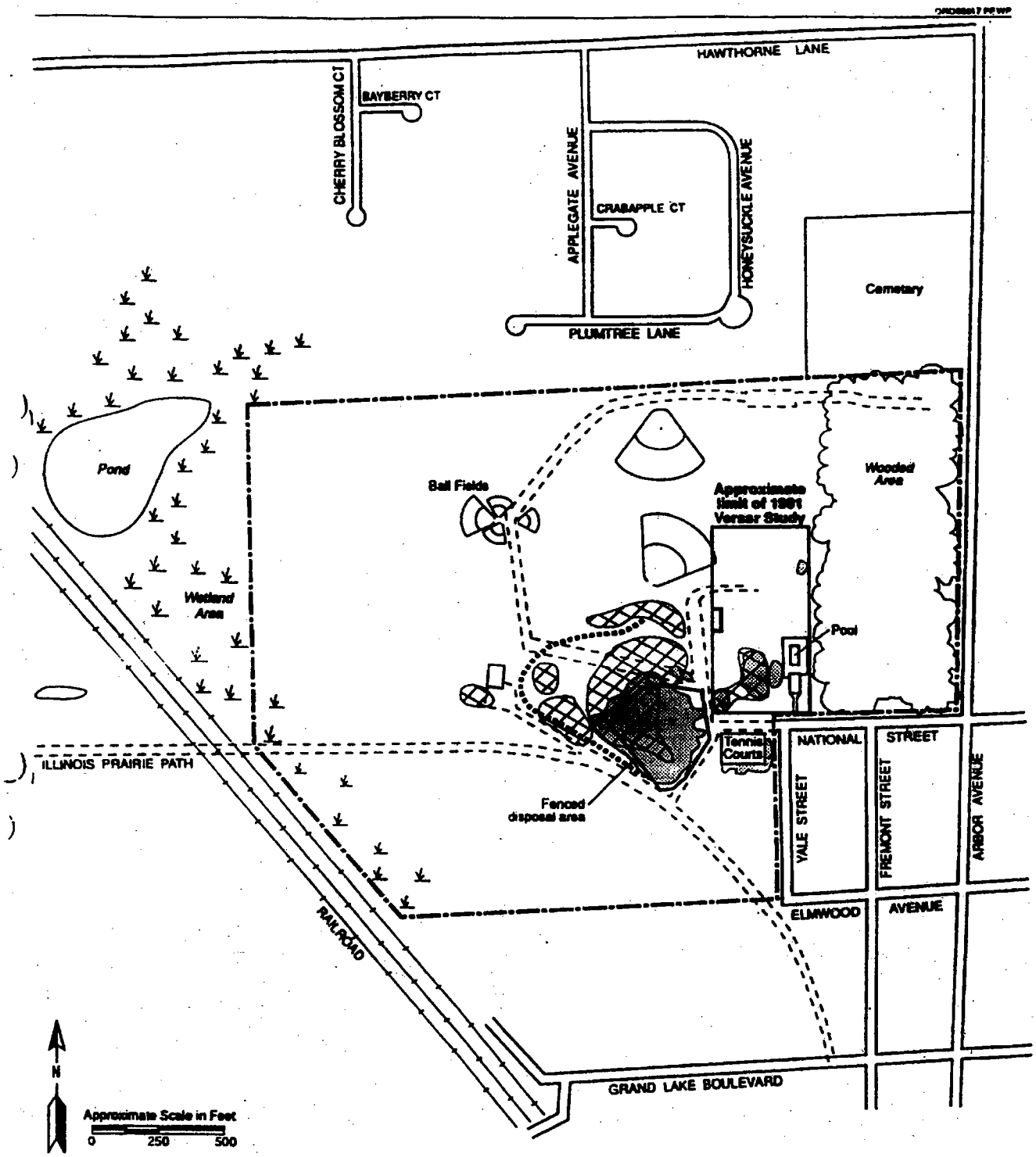

Figure 1-2
Site Map
Reed-Keppler Park RI/FS Work Plan

ATTACHMENT 3

ACTION CRITERIA
FOR SUPERFUND REMOVAL ACTIONS
AT THE KERR-McGEE RESIDENTIAL AREAS SITE
WEST CHICAGO, ILLINOIS

Prepared by
U.S. EPA Region 5

November 1993

ACTION CRITERIA
FOR SUPERFUND REMOVAL ACTIONS
AT THE KERR-McGEE RESIDENTIAL AREAS SITE
WEST CHICAGO, ILLINOIS

Introduction

Under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (commonly known as Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986, the United States Environmental Protection Agency (U.S. EPA) is authorized, among other things, to take response actions whenever there is a release or threat of a release of a hazardous substance into the environment. The National Priorities List (NPL) is a list of hazardous waste sites across the country that are eligible for U.S. EPA response actions under Superfund.

The U.S. EPA has listed four sites in the vicinity of the City of West Chicago, Illinois, on the NPL. The primary contaminants of concern at these sites are radioactive thorium and its decay products derived from ore processing operations at a factory in West Chicago, now known as the Kerr-McGee Chemical Corporation West Chicago Rare Earths Facility ("factory site"). Three of the NPL sites became contaminated when the processing wastes (thorium mill tailings) were removed from the factory and used primarily as fill material in and around the City of West Chicago. These sites are known as:

(1) Kerr-McGee (Residential Areas) site,
(2) Kerr-McGee (Sewage Treatment Plant) site, and
(3) Kerr-McGee (Reed-Keppler Park) site.

The fourth site became contaminated when discharges and runoff from the factory site traveled via a storm sewer into nearby Kress Creek and downstream to the West Branch of the DuPage River. This site is known as:

(4) Kerr-McGee (Kress Creek/West Branch of DuPage River) site.

It is important to note that the Residential Areas site may encompass not only residential properties, but also institutional, commercial and municipal properties. Although primarily contaminated because thorium mill tailings were used as fill, some of the properties may have become contaminated due to windblown material from the factory site.

The Kerr-McGee factory site from which the contamination originated has not been listed on the NPL; it is regulated under the licensing authority of the Illinois Department of Nuclear Safety (IDNS). Decommissioning, clean-up and closure of the factory site currently is being addressed under that authority.

Purpose and Intent

The purpose of this document is to establish criteria for U.S. EPA's response actions at contaminated properties ("Residential Areas") that are not part of the Sewage Treatment Plant, Reed-Keppler Park or Kress Creek/West Branch of DuPage River sites. Those three NPL sites will be addressed by U.S. EPA in separate actions.

It is the intent of the U.S. EPA to address the contamination problems at the Residential Areas by removal actions wherever practicable. Removal actions generally provide more immediate protection than do long-term remedial actions, and are consistent with the movement in the Superfund program to accelerate site cleanups.

U.S. EPA's actions under Superfund will be limited to those properties where the contamination is attributed to process wastes (thorium mill tailings) from the factory site. When naturally occurring radioactive materials not associated with process wastes cause U.S. EPA's action criteria to be exceeded, any corrective actions will have to take place through a separate mechanism, because Superfund generally does not give U.S. EPA the authority to remediate threats from naturally occurring substances.

This document contains the criteria that U.S. EPA will use to designate properties for removal actions and to verify that cleanup to levels protective of human health and the environment has been achieved. The U.S. EPA does not have standardized criteria for removal actions of this type. Consequently, site-specific criteria have been developed by the U.S. EPA in consultation with the IDNS for use at the Residential Areas. The criteria specified in this document will be used during three separate phases of the cleanup action: the **discovery phase**, the **characterization phase**, and the **verification phase.** Each of these phases and the criteria for each are described in detail later in this document. This document also contains release criteria for releasing equipment from work sites for unrestricted use.

Applicable or Relevant and Appropriate Requirements

Under Superfund, long-term remedial actions must attain Federal and more stringent State "applicable or relevant and appropriate requirements" (ARARs) during and at the completion of the remedial action. Removal actions (such as the type planned at the Residential Areas) must attain ARARs to the extent practicable. Therefore, U.S. EPA relied upon Federal and State ARARs to the extent practicable to establish the criteria in this document.

"Applicable requirements" are cleanup standards or other environmental protection requirements that specifically apply to the substances or activities at the site. In other words, an applicable requirement is one that a private party would have to comply with by law if the same action was being taken apart from Superfund authority.

If a requirement is not applicable, it still may be relevant and appropriate. "Relevant and appropriate requirements" are those cleanup standards that address problems or situations sufficiently similar to those at the Superfund site that their use is well suited to the particular site. A relevant and appropriate requirement must be both relevant to the conditions at the site and appropriate for use at the site, given the circumstances.

If a Federal or State requirement is neither applicable nor relevant and appropriate (and thus not an ARAR), it still may be useful to U.S. EPA when determining the necessary level of cleanup for protection of human health and the environment. Such "to-be-considered" material (TBCs) can include

promulgated regulations that do not qualify as ARARs, and non-promulgated advisories or guidance issued by Federal or State government. Superfund actions are not required to meet TBCs.

Only requirements that are duly promulgated under Federal or State law can be ARARs. Additionally, only substantive requirements of regulations, not procedural requirements, can be ARARs for on-site actions.

The U.S. EPA has identified the following major sources of ARARs and TBCs for the cleanup actions at the Residential Areas:

Title 40, Part 192 of the Code of Federal Regulations (40 CFR 192), entitled "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings" - 40 CFR 192 contains U.S. EPA's standards for cleanup of lands contaminated by uranium and thorium mill wastes. The standards apply only to the sites specifically designated under the Uranium Mill Tailings Radiation Control Act of 1978, but they often have been used as criteria at uranium, thorium and radium sites because of the similarity of the problems. They are not applicable to the Residential Areas, but U.S. EPA considers portions to be relevant and appropriate.

Title 32, Chapter II, Subchapter b, Part 332 of the Illinois Administrative Code, entitled "Licensing Requirements for Source Material Milling Facilities" - These regulations deal with licensing requirements for source material milling facilities in Illinois and apply to the Kerr-McGee factory site in West Chicago. They are not applicable to the Residential Areas, but U.S. EPA considers portions to be relevant and appropriate and portions to be TBCs.

Title 32, Chapter II, Subchapter b, Part 340 of the Illinois Administrative Code, entitled "Standards for Protection Against Radiation" - These regulations establish standards for protection against radiation hazards, primarily in an occupational setting; they control the possession, use and transfer of sources of radiation by "licensees and registrants" so that the total dose to an individual does not exceed specified standards. They also contain decontamination guides for the release of equipment for unrestricted use. These regulations are not applicable to the Residential Areas, but U.S. EPA considers portions to be relevant and appropriate.

DOE Order 5400.5, entitled "Radiation Protection of the Public and the Environment" - This Order establishes standards and requirements for Department of Energy (DOE) operations with respect to protection of members of the public against undue risk from radiation, and contains a discussion of DOE's "ALARA" (As Low As Reasonably Achievable) approach. The Order is not a promulgated Federal or State regulation, and thus cannot be an ARAR, but U.S. EPA considers portions of the Order to be TBCs.

Title 10, Part 20 of the Code of Federal Regulations (10 CFR 20), entitled "Standards for Protection Against Radiation" - These regulations contain the Nuclear Regulatory Commission's standards for protection against radiation, and contain an "ALARA" approach. They are not applicable or relevant and appropriate to the Residential Areas, but U.S. EPA considers portions to be TBCs.

U.S. Nuclear Regulatory Commission's Regulatory Guide 8.37 - This regulatory guide contains, among other things, a discussion of the NRC's "ALARA" approach. The regulatory guide is not a promulgated regulation, and thus cannot be an ARAR, but U.S. EPA considers a portion of the guide to be a TBC.

U.S. Nuclear Regulatory Commission's Regulatory Guide 1.86 - This regulatory guide contains, among other things, decontamination guides for the release of equipment for unrestricted use. The regulatory guide is not a promulgated regulation, and thus cannot be an ARAR, but U.S. EPA considers a portion of the guide to be a TBC.

The Action Criteria

The remainder of this document describes the different phases of the cleanup action, the specific Federal and State requirements that U.S. EPA considers to be ARARs or TBCs, and the resulting action criteria for each phase of the cleanup action.

DISCOVERY AND CHARACTERIZATION PHASES

The first phase of the cleanup action is the discovery phase. During this phase, properties in and around the City of West Chicago will be surveyed and sampled to discover and designate those that require cleanup. If a property clearly exceeds the discovery criteria, and if it is clear that the exceedance is due to thorium mill tailings from the factory site, the property will be designated for removal action. If it is not clear whether a property exceeds the discovery criteria (i.e., borderline results), or if it is not clear whether exceedance of the criteria is due to thorium mill tailings, then further investigation will be needed before a decision can be made to designate that property for response action. Such properties will move into the characterization phase.

Because the objective of both discovery and characterization is the same (i.e., to find contaminated properties), the action criteria during these two phases are identical. Properties deemed not to exceed the action criteria during either discovery or characterization will be excluded from further consideration.

Due to the nature of the radiological contamination at the Residential Areas, survey efforts during the discovery phase will consist of measuring and/or sampling the following four parameters: outdoor soil concentration, outdoor

gamma exposure rate, indoor gamma exposure rate and indoor radon/thoron air concentration.

The primary criterion that will be used to designate a property for response action is outdoor soil concentration. The other three parameters (outdoor gamma exposure rate, indoor gamma exposure rate and indoor radon/thoron air concentration) will be used as indicators or "finding tools" to help locate contaminated areas; elevated readings for any of these three parameters alone generally will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

The U.S. EPA has taken a conservative approach with the discovery and characterization criteria in order to minimize the chances of not discovering properties where contamination actually is present. As a result, the discovery criteria may be more stringent than the verification criteria (e.g., for outdoor soil concentrations, the results will not be averaged over 100 square meters during discovery and characterization, but averaging over 100 m^2 may be conducted during the verification phase).

For indoor radon/thoron, the necessity for expeditious surveillance argues for measurements on a shorter time frame than the annual average (or equivalent) associated with the wording of the relevant and appropriate requirement. In order to not unduly delay assessments, discovery and characterization measurement periods may be on the order of 2 days to 3 months. Since weather, seasons and home usage all influence indoor radon/thoron levels, these shorter measurements may not fully characterize the annual average but should be adequate to serve as "finding tools." Also, many homes may have elevated levels of naturally occurring radon that are not associated with the presence of thorium mill tailings on the property. For these reasons, an elevated reading of indoor radon/thoron will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

Discussed below are the criteria that will be used during the discovery and characterization phases of the response action:

- **Outdoor Soil Concentration**

  Soil standards for mill tailings of the type present at the Residential Areas are found in 40 CFR 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," and at Section 332.150(b) of the Illinois Administrative Code. None of the standards are applicable to the Residential Areas, but portions are relevant and appropriate. Because the State standard is more stringent than the Federal standard (by specifying that the concentration limit is for dry soil), the State regulation is considered as the ARAR.

  The State regulation at Section 332.150(b) of the Illinois Administrative Code specifies that the licensed site shall be

decontaminated to the following limits prior to termination of the license:

> "Concentrations of radionuclides in soil above background concentrations for total radium, averaged over areas 100 square meters, shall not exceed:
>
> A) 5 picocuries per gram of dry soil, averaged over the first 15 centimeters below the surface; and
>
> B) 15 picocuries per gram of dry soil, averaged over layers of 15 centimeters thickness more than 15 centimeters below the surface."

The State requirements in Section 332.150(b) of the Illinois Administrative Code were based on the federal standards in 40 CFR 192.12(a). When the federal standards in 40 CFR 192 were developed over a decade ago, the 5 picocuries per gram (pCi/g) standard was a health based standard, but the 15 pCi/g standard for subsurface soil was technology based, reflecting instrument limitations in locating subsurface deposits. The 15 pCi/g limit is not a health-based standard, and should not be applied to situations in which a health-based standard is appropriate, or to situations that differ substantively from those for which it was derived.

The 15 pCi/g limit was developed as a practical measurement tool for use in locating discrete caches of high activity tailings (typically 300-1000 pCi/g) that were deposited in subsurface locations at mill sites or at nearby properties. The subsurface soil standard in 40 CFR 192 was originally proposed as 5 pCi/g. The final standard was changed, not because the health basis was relaxed, but rather in order to reduce the cost to DOE of locating buried tailings - under the assumption that this would result in essentially the same degree of cleanup at the DOE sites as originally proposed under the 5 pCi/g criterion. The use of a 15 pCi/g subsurface criterion allowed the DOE to use field measurements rather than laboratory analysis to determine when buried tailings had been detected. It is only appropriate for use as a cost-effective tool to locate radioactive waste in situations where contaminated subsurface materials are of high activity and are not expected to be significantly admixed with clean soil. The 15 pCi/g subsurface criterion was not developed for situations where significant quantities of moderate or low activity materials are involved, such as at the Residential Areas site. Therefore, the 15 pCi/g subsurface criterion is not appropriate for use at the Residential Areas site, and thus is not an ARAR. The 5 pCi/g standard, on the other hand, was developed as a health-based standard and is appropriate for use at the Residential Areas site.

Although the soil concentration standard in the regulation is written in terms of an average over an area of 100 square meters, areal averaging will not be conducted during discovery and characterization. This approach is conservative and should minimize the chances of not identifying contamination during the discovery and characterization surveys.

Therefore,

> **The Discovery and Characterization Criterion for outdoor soil concentrations will be exceedance of 5 picocuries per gram total radium (radium-226 plus radium-228), dry soil, above background in any 15 centimeter depth based upon Section 332.150(b) of the Illinois Administrative Code.**

- Outdoor Gamma Exposure Rates

Section 332.150(b)(2) of the Illinois Administrative Code, "Termination of Source Material Milling Facility License," deals with a site licensed by IDNS that is to be decontaminated for license termination. It states that the licensed site shall be decontaminated to the following limits prior to termination of the license:

> "The level of gamma radiation measured at a distance of 100 centimeters from the surface shall not exceed background."

This regulation applies only to a licensed site, but the requirements are relevant to the Residential Areas since the intent of the standards is to limit public exposure from site-related radioactive materials.

The variability and distribution of naturally-occurring radioactive materials results in a range of normal background levels, even within a small region such as a few mile radius around West Chicago. In part, this originates from variable geological constituents and in part from human actions (such as phosphate fertilization which can add additional radium to the soil). Consequently, there is not a single number that can be said to be "background" for the entire West Chicago region. While not represented by a single number, the normal background levels of gamma exposure rate will fall within a range and in a fairly predictable statistical pattern. Consequently, a statistical method will be applied to both establish background and what is distinctly above background.

Because there are sources unrelated to thorium mill tailings (such as phosphate fertilizers) that could cause elevated gamma readings at the Residential Areas, it is not appropriate to use the background gamma standard during the discovery phase as a strict, single criterion that, in and of itself, triggers cleanup. However, U.S. EPA will use measurements of outdoor gamma exposure rate as a "finding tool" to locate those areas that are statistically distinct from background. Gamma readings found to be statistically distinct from background at a property will be an indication of possible thorium mill tailings contamination. Such areas will, at a minimum, be investigated further. Elevated gamma readings alone generally will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

Because the background gamma standard will be used extensively as a "finding tool" and not as a strict criterion, exposure rates may be measured at varying heights from the ground surface (typically, 0 to 1 meter), depending on detection sensitivities, practicality, and other conditions encountered in the field.

Therefore,

> **The Discovery and Characterization Criterion for outdoor gamma exposure rate will be the statistical exceedance of background based upon the Illinois Administrative Code, Section 332.150(b)(2).**

- Indoor Gamma Exposure Rates

The only promulgated standard that specifically deals with indoor gamma exposure rate is 40 CFR 192.12(b)(2), which states that the objective of remedial action shall be that

> "In any occupied or habitable building--...The level of gamma radiation shall not exceed the background level by more than 20 microroentgens per hour."

Gamma ray exposure to 20 microroentgens per hour for a substantial portion of the year could result in an annual dose exceeding 100 millirem, due solely to external exposure to gamma rays. Recommendations by eminent bodies of radiation scientists, and regulations and policies of federal agencies such as the Nuclear Regulatory Commission and the Department of Energy, are to limit doses to members of the general public to less than 100 millirem per year, including both external exposure (from gamma rays) and internal exposure (from inhalation and ingestion). In addition, NRC's regulations at 10 CFR 20, DOE Order 5400.5 and NRC Regulatory Guide 8.37 contain an "ALARA" (As Low As Reasonably Achievable) approach, which sets forth an objective to attain dose levels as far below the dose limits as practicable. Moreover, EPA believes that individual sources of contamination should be kept to a small fraction of the primary limit of 100 millirem per year, and generally sets annual dose standards below a couple of tens of millirems.

As a result of the above considerations, 40 CFR 192.12(b)(2) is not appropriate for use at the Residential Areas site, and thus is not an ARAR.

Although meant to apply to outdoor situations, the gamma exposure rate standard found at Section 332.150(b)(2) of the Illinois Administrative Code is a TBC for indoor gamma exposure rate, since the intent is to limit public exposure to site-related radioactive materials, and since periods of occupancy are higher indoors than outdoors.

As with outdoor gamma exposure rate, normal background values for indoor gamma exposure rate will fall within a range and in a fairly predictable statistical pattern; background is not a single value and must be treated statistically. In addition, different building materials (such as bricks, concrete blocks and granite hearths) that contain naturally occurring radiological materials could cause elevated indoor gamma readings that are unrelated to thorium mill tailings. For these reasons, U.S. EPA will use measurements of indoor gamma exposure rate as a "finding tool" to locate contaminated areas that may be below or alongside the foundations of buildings. Elevated indoor gamma readings alone generally will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

Therefore,

> **The Discovery and Characterization Criterion for indoor gamma exposure rate will be the statistical exceedance of background, based upon the Illinois Administrative Code, Section 332.150(b)(2).**

As with outdoor gamma exposure rate, a statistical method will be applied to both establish background and what is distinctly above background.

- **Indoor Radon/Thoron Decay Product Concentrations**

Standards dealing with indoor radon decay product concentrations are found at 40 CFR 192.12(b)(1), which states that:

> "In any occupied or habitable building-- The objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. ... (WL, or working levels, is a measure of the concentration of radon decay products.)

While radon-222 (commonly known just as radon) is produced from the Uranium Decay Series, radon-220 (commonly known as thoron) is the Thorium Decay Series form of radon. 40 CFR 192.40(b) states that the provisions of the standard applicable to radon also apply to thoron. U.S. EPA interprets the radon decay product concentration of 0.02 WL at 40 CFR 192.12(b)(1) to represent the combined (total) concentration of decay products from both radon and thoron.

In the absence of the thorium mill tailings, naturally occurring decay product concentrations consist primarily of radon, with thoron decay product levels at about 25% to 50% of those of radon. However, since the thorium decay series radionuclides dominated in the ores used at the factory site, it is reasonable to assume that contaminated properties may show elevated levels of thoron if tailings are located below or

alongside the foundation of a building. However, because of different half lives in the thoron decay series, and depending on the location of the tailings, not every contaminated property will show elevated levels of thoron.

Due to the need for expeditious surveillance, measurements during the discovery and characterization phases will occur over a shorter time frame than the annual average (or equivalent) associated with the wording of the relevant and appropriate requirement. In order to not unduly delay assessments, discovery and characterization measurement periods may be on the order of 2 days to 3 months. Since weather, seasons and home usage all influence indoor radon/thoron levels, these shorter measurements may not fully characterize the annual average but should be adequate to serve as "finding tools."

As with outdoor and indoor gamma exposure rate, there is a natural variability in the range of indoor radon/thoron decay product concentrations. Some areas of West Chicago, as in other parts of the country, may have naturally high levels of indoor radon that are totally unrelated to thorium mill tailings. For these reasons, U.S. EPA will use measurements of indoor radon/thoron decay product concentrations as a "finding tool" to help locate contaminated areas that may be below or alongside the foundations of buildings. Elevated indoor radon/thoron decay product readings alone will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

Therefore,

> **The Discovery and Characterization Criterion for indoor radon/thoron decay product concentrations is 0.02 WL combined radon and thoron decay products (including background) based upon 40 CFR 192.12(b)(1).**

If a property exceeds this criterion due to naturally-occurring radon, and there is no other indication of thorium mill tailings on the property, the property will not be remediated as part of this Superfund action.

- **"As Low As Reasonably Achievable" (ALARA).**

As discussed above, NRC's regulations at 10 CFR 20, DOE Order 5400.5 and NRC Regulatory Guide 8.37 all contain an ALARA approach which sets forth the objective to attain dose levels as far below the dose limits as practicable. These requirements are TBCs for the removal actions at the Residential Areas.

In addition, Section 340.1000(b) of the Illinois Administrative Code is a TBC for the removal actions at the Residential Areas. Section 340.1000(b), which applies to "licensees and registrants," states,

> "In addition to complying with the requirements set forth in this Part, every reasonable effort should be made to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term 'as low as is reasonably achievable' means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of ionizing radiation in the public interest."

The NRC regulations at 10 CFR 20 contain similar language.

As a result, during discovery and characterization, the following ALARA approach will be used for the Residential Areas site:

> **Every reasonable effort should be made to maintain radiation exposures, and the amount of radioactive materials in unrestricted areas, to levels that are as low as is reasonably achievable.**

VERIFICATION PHASE

Once a property has been designated for a removal action, the success of the operation must be verified during and at the completion of the removal action. During the verification phase, properties will be surveyed and sampled to ensure that cleanup to levels protective of human health and the environment has been achieved.

As indicated below, some of the verification criteria will be applied during and immediately following the removal action, with surveys and samples collected before the open excavation is backfilled with clean material. Some of the verification criteria will be applied later, with surveys and samples collected after the excavation is backfilled.

The criteria to be used during the verification phase are as follows:

- **Outdoor Soil Concentrations**

  The Verification Criterion for this parameter will be soil concentrations that do not exceed 5 picocuries per gram total radium (radium-226 plus radium-228), dry soil, above background, averaged over areas up to 100 square meters, in any 15 centimeter depth based upon Section 332.150(b) of the Illinois Administrative Code.

  Samples for outdoor soil concentrations will be collected before backfilling.

- Outdoor Gamma Exposure Rates

During cleanup of a property, as during the discovery and characterization phases, outdoor gamma exposure rates will be used as a "finding tool" to help determine where additional excavation may be needed. The main criterion to determine when excavation can cease, however, is the outdoor soil concentration criterion.

However, Section 332.150(b)(2) of the Illinois Administrative Code (which requires that, prior to termination of the license, the licensed site be decontaminated so that "The level of gamma radiation measured at a distance of 100 centimeters from the surface shall not exceed background") is relevant to the Residential Areas, and is appropriate for application at the completion of a cleanup action at a property.

Therefore,

> **The Verification Criterion for this parameter will be outdoor gamma exposure rates that do not statistically exceed background at a distance of 100 centimeters from the surface, based upon the Illinois Administrative Code, Section 332.150(b)(2).**

Outdoor gamma exposure rate surveys to verify that this criterion has been met will be conducted after backfilling. A statistical method will be applied to both establish background and what is distinctly above background.

- Indoor Gamma Exposure Rates

For properties that require cleanup and that were found, during discovery and characterization, to have elevated levels of indoor gamma exposure rate due to thorium mill tailings contamination on the property, indoor gamma exposure rate surveys will be used during the cleanup action as a "finding tool" to help determine if additional excavation is necessary.

> **The Verification Criterion for this parameter will be indoor gamma exposure rates that do not statistically exceed background based upon the Illinois Administrative Code, Section 332.170(c).**

For properties that require cleanup, but for which no elevated indoor gamma readings were found during discovery and characterization, indoor gamma surveys will not be conducted during the verification phase.

- Indoor Radon/Thoron Decay Product Concentrations

For properties that require cleanup and that were found, during discovery and characterization, to have elevated levels of indoor radon/thoron decay product concentrations due to thorium mill tailings contamination on the property, additional surveys will be conducted at the completion of the cleanup action to determine if the following verification criterion has been met:

> **In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) combined radon and thoron decay product concentration (including background) not to exceed 0.02 WL. In any case, the combined radon and thoron decay product concentration (including background) shall not exceed 0.03 WL. (Based on 40 CFR 192.12(b)(1).)**

For properties that require cleanup, but for which no elevated indoor radon/thoron decay product concentrations due to thorium mill tailings were found during discovery and characterization, indoor radon/thoron testing will not be required during the verification phase.

- **"As Low As Reasonably Achievable" (ALARA)**

In addition to meeting the verification criteria described above, the following ALARA approach will be used during cleanup actions:

> **Every reasonable effort should be made to maintain radiation exposures, and the amount of radioactive materials in unrestricted areas, to levels that are as low as is reasonably achievable.**

RELEASE CRITERIA

In addition to the above criteria for discovery, characterization and verification, it will be necessary throughout the project to release equipment from work sites and it may be necessary to assess whether materials or surfaces are suitable for unrestricted use. Requirements for such situations are found in the Illinois Administrative Code, Section 340, Appendix C(a); these requirements are relevant and appropriate for use at the Residential Areas. Similar requirements also are found in the U.S. Nuclear Regulatory Commission's Regulatory Guide 1.86, Table 1; these guidelines are not ARARs (since only promulgated regulations can be ARARs), but the U.S. EPA does consider them to be TBCs.

Both sets of requirements are shown below. Since the requirements are set up with differing units, the most restrictive part for a given situation would be used.

- Illinois Administrative Code, Section 340, Appendix C(a)

DECONTAMINATION GUIDES

a) Surface Contamination Guide

Alpha Emitters

Removable	15 pCi per 100 cm^2 = 33 dpm per 100 cm^2		average over any one surface
	45 pCi per 100 cm^2 = 100 dpm per 100 cm^2		maximum
Total (fixed)	450 pCi per 100 cm^2 = 1,000 dpm per 100 cm^2		average over any one surface
	2,250 pCi per 100 cm^2 5,000 dpm per 100 cm^2		maximum
	0.25 mRem per hour at 1 cm		

Beta-Gamma Emitters

Removable (all beta-gamma emitters except Hydrogen 3)	100 pCi per 100 cm^2	average over any one surface
	500 pCi per 100 cm^2	maximum
Removable (Hydrogen 3)	1,000 pCi per 100 cm^2	average over any one surface
	5,000 pCi per 100 cm^2	maximum
Total (fixed)	0.25 mRem per hour at 1 cm from surface	

- U.S. Nuclear Regulatory Commission, Regulatory Guide 1.86, Table 1

TABLE 1

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDE [a]	AVERAGE [b,c]	MAXIMUM [b,d]	REMOVABLE [b,e]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α per 100 cm^2	15,000 dpm α per 100 cm^2	1,000 dpm α per 100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm per 100 cm^2	300 dpm per 100 cm^2	20 dpm per 100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm per 100 cm^2	3000 dpm per 100 cm^2	200 dpm per 100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm ß-γ per 100 cm^2	15,000 dpm ß-γ per 100 cm^2	1000 dpm ß-γ per 100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

Criteria Not Chosen for Discovery, Characterization or Verification

Discussed below are other parameters and their associated regulations and standards that were reviewed by U.S. EPA to determine whether they were ARARs and should be used as discovery, characterization and/or verification criteria. None of these standards is applicable to the removal action and, as explained below, none is relevant and appropriate.

- Outdoor Radon Concentrations

  Outdoor radon (radon-222) and thoron (radon-220) are regulated in Section 332.170(b) of the Illinois Administrative Code:

  > "During the operating life and facility decommissioning, the combined concentration of radon and thoron at the boundary of the licensed site, measured at a height of one meter from the surface, averaged annually, shall not exceed three picocuries per liter above the background concentration at the licensed site."

  Even though on its terms the regulation applies only to a licensed facility, the intent of the regulation is to control radon and thoron in off-site areas, since the point of compliance is at the boundary of the licensed site. Therefore, the U.S. EPA considers the regulation to be relevant to the Residential Areas.

  However, there are practical reasons why measurements for radon and thoron outdoors will not aid in the identification of contaminated properties not otherwise identified by outdoor gamma exposure rate surveys and outdoor soil concentration samples. These reasons are as follows: (1) Reliable radon and thoron measurements are not immediate, but can take days or weeks to measure good averages. Gamma surveys, on the other hand, can provide instantaneous measurements; (2) Unless the emissions are extremely large, radon and thoron emitted from the ground surface will rapidly mix in the open air, making them indistinguishable from naturally occurring radon and thoron. Large radon and thoron emissions would be associated with large contaminant deposits easily identifiable by gamma survey instruments; (3) Because radon and thoron are gases that can be transported by the wind, it would be much harder to pinpoint the emission site.

  Therefore, for the reasons stated above, outdoor radon concentrations (radon and thoron), though relevant, are not appropriate to these circumstances and will not be one of the criteria for this response action.

- Radon Release Rates from Soil

  The emission of radon (radon-222) and thoron (radon-220) from soils is regulated in Section 332.170(c) of the Illinois Administrative Code, which states:

> "The disposal area shall be designed so that after reclamation and stabilization, the annual total radon release rate through the cover from the byproduct material shall not exceed two picocuries per square meter per second."

This regulation only applies to the disposal area at a licensed facility, but the intent of the regulation is to control the total radon emission to the environment and to protect the general population.

However, Section 332.240(a) of the Illinois Administrative Code states:

> "Monitoring for total radon after installation of an appropriately designed cover is not required. Total radon emissions from cover material shall be estimated as part of developing a closure plan."

Since it appears that the State never intended that actual measurements be made to show compliance with the regulation, the U.S. EPA does not consider this regulation to be relevant and appropriate for use at the Residential Areas. In addition, there are other, practical reasons why measurements of radon and thoron emissions from soil would not be an appropriate indicator of contaminants. At the Residential Areas, thoron is the dominant radon isotope of concern. If thoron is produced at a depth of more than a few inches below the ground surface, it will radioactively decay to a solid element and cease moving through the soil before reaching the surface. Soil sampling, on the other hand, will find contaminants at much greater depth, as would gamma exposure rate measurements which penetrate soil depths on the order of several feet.

Consequently, measurements for radon and thoron emission rates will not be conducted during this response action.

- **Doses in the General Environment**

Thorium-related doses in the general environment are regulated in 40 CFR 192.41(d), which states:

> "Operations...shall be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its daughters excepted, to the general environment."

Doses in the general environment also are regulated in Section 332.170(a) of the Illinois Administrative Code, which states:

> "At all times, concentrations of radioactive material, excluding radon, thoron, and their progeny, which may be released to the general environment in groundwater, surface water, air, soil, or other means shall not result in a committed effective dose in excess of 25 millirem (0.25 mSv) to the whole body, and a

committed dose equivalent in excess of 75 millirem (0.75 mSv) to the thyroid, and 25 millirem (0.25 mSv) to any other organ of any member of the public."

* mSv designates milliSieverts, a dose unit equal to 100 millirem.

Neither of the above regulations is applicable to the Residential Areas, but the U.S. EPA considers both to be relevant.

Even though the dose requirements of 40 CFR 192.41(d) and Section 332.170(a) of the Illinois Administrative Code are relevant to the Residential Areas, there are practical reasons why performing dose assessment calculations will not aid in the identification of contaminated properties not otherwise detected by the other discovery criteria. An operational assumption for this response action is that where site parameters such as indoor or outdoor gamma exposure rate, outdoor soil concentrations, or indoor radon and thoron are elevated, dose is elevated proportionally. Therefore, having specific dose calculations is not appropriate as it will not provide useful information not already provided by other parameters. Consequently, no separate dose assessment calculations will be required for this response action.